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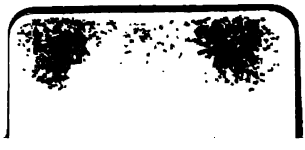

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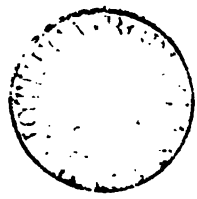

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LIVERPOOL AND MANCHESTER

MEDICAL AND SURGICAL REPORTS.

NOTES

ON

CASES OF FRACTURE, WITH DISPLACEMENT OF THE SPINE, SUCCESSFULLY TREATED BY EXTENSION.

By T. GULSTON WOLLASTON, M.D.,
HONORARY SURGEON TO THE LIVERPOOL ROYAL SOUTHERN HOSPITAL.

I AM induced to submit the following cases to the readers of the 'Liverpool and Manchester Medical and Surgical Reports,' under the impression that many surgeons are too apt to treat such accidents on the "do nothing" principle, and I trust that a perusal of the following condensed notes may tend to prove that benefit may, in some cases, be derived by the mode adopted; it can do no harm, and in such fearfully wretched cases, as every surgeon knows who has had to treat them, the least hope of ameliorating the patient's subsequent sufferings should be embraced.

Judging from the amount of deformity in each of the three following cases, we may safely infer that the pressure on the cord must have been very great, though probably no actual rupture took place. The necessity also for the relief of this pressure at the very earliest period possible is obvious, for if allowed to exist any length of time, our endeavours will be futile; in each

instance reduction was effected under an hour from the receipt of the injury.

With regard to the mode of reduction the plan employed was as follows:—The patient was placed on a mattress on the floor, and chloroform given fully; a well-padded strap, passed across the back of the shoulders, and the ends brought under the arms and in front of the clavicles and secured to a ring-bolt in the floor, was sufficient to fix the upper portion of the body, the arms, of course, being at the same time confined to the side.

A soft, double strap was buckled round the lower portion of each thigh, and the hook of the pulleys applied to the centre of this. By means of this arrangement, the position of the patient can be altered at will, and manipulation rendered much more easy.

If the displaced bones can be got back into their original position, all that is necessary is to place a firm pad over the seat of injury, secured by strips of Empl. Roborans; it may be advisable to order the patient to lie on a small, narrow pillow placed in the direction of the spinal column.

If it were necessary to keep up extension for any length of time, it might readily be effected by securing the upper portion of the body by means of axillary bands to the bedposts, and fixing the lower extremities with weights and pulleys, as in an ordinary case of fracture of the femur.

If reduction has been properly effected, it will be found that the parts become firmly welded together in the course of five or six weeks, and that no apparatus will be required to be worn.

In the treatment of the subsequent bladder trouble, I have found Holt's winged catheters of the greatest possible advantage, combined with the internal administration of strychnine, either in the ordinary mode or in the form of Easton's syrup.

J. M—, æt. 36, while in a state of intoxication, walked over one of the pier heads and fell on the river bed below, a distance of forty feet. In this position he remained for four hours, until roused by the advancing tide. He was hoisted up by ropes and carried on a stretcher to the hospital.

On admission, Nov. 18th, he was unable to stand, and complained of intense pain from the toes of both feet up to the hips, and also of a feeling of stiffness in the back. On examining the back, there was considerable ecchymosis over the lower portion of the dorsal region, and the eleventh dorsal vertebra was displaced and protruded fully an inch and a half out of its normal position. No crepitus could be felt. Hyperæsthesia of the lower extremities existed in a most marked degree, a breath of air or the slightest touch of a feather causing the most excruciating agony. Without any stimulus, paroxysms of pain came on every three or four minutes, commencing at the plantar base of the toes. There was neither paraplegia or priapism.

Treatment.—The patient being placed on a mattress on the floor, chloroform was administered to its full extent. The shoulders were then securely fixed, and the pulleys applied to both thighs. During extension the hand, placed over the projecting part of the spine, felt the displacement gradually disappear, but without crepitus or jerk. Hot-water bottles were applied to the feet, a dose of tincture of opium given, the catheter passed, and the patient desired to lie on his back. A pad of lint was placed over the injured part and firmly secured with plaster.

Nov. 19th.—Restless night, the attacks of pain being very severe with only very short intervals. Although he has been tossing from side to side no displacement has occurred, but a slight "dip" is felt at the seat of injury. The plaster was readjusted, one third of a grain of morphia was injected into the calf of one leg, and both lower extremities elevated on pillows. Catheter necessary. Towards evening, as no relief had been experienced, the injection was repeated in the other leg and with immediate benefit. Temperature, upper extremity 97°, lower 98·5°; pulse 98.

20th.—Better; pain in legs not so intense unless touched; abdomen tympanitic, and he is unable to pass flatus; little or no pain at seat of injury; great thirst and constant vomiting. Urine loaded with mucus and highly ammoniacal. Ordered iced milk; morphia injection repeated. Catheter thrice daily. Temperature, upper 97·6°, lower 98·4°; pulse 96; respirations 20.

21st.—Easier; still very sick. Two turpentine and oil enemata

have been given without effect. Discontinue morphia injection, and take only iced soda water and milk. Temperature, upper 99·2°, lower 96·8°; pulse 98; respirations 18.

22nd.—The same; bowels acted, but he is not aware of it; vomiting continues; towards evening pain more severe; hypodermic injection repeated. Ordered a purgative by the mouth. Temperature, upper 99·8°, lower 96·4°; pulse 90; respirations 18.

24th.—Much better; bowels freely moved yesterday; hyperæsthesia diminishing; numbness of lower extremities; urine very alkaline. Ordered dilute nitro-hydrochloric acid, chop and a pint of ale. There is a tendency to sloughing over the nates; spine firmly strapped, and placed on a water bed. Temperature, same as yesterday.

Dec. 4th.—Has continued steadily to improve; the hyperæsthesia has disappeared, with the exception of a little at the outer aspect of each leg. He has passed urine to day for the first time since the accident; has been sitting up in bed; complains only of what he calls a "galvanic" sensation in the legs. Bowels obstinate, requiring the administration of purgatives.

23rd.—Got up to-day, and was able to move about the ward with crutches and assistance; legs and feet very numb.

From this date he rapidly improved; the legs gradually regained their proper feeling, and his only complaint is a feeling of stiffness if he stoops to pick an object from the floor.

Jan. 1st.—Discharged cured, with only very slight thickening at the seat of injury.

J. McG—, porter, æt. 29, admitted Jan. 26th, suffering from fracture of spine with displacement. The injury was one from direct violence, having been caused by a bale of cotton falling on the man whilst in a stooping posture. On examination, it was found that the fourth, and a considerable portion of the fifth, dorsal vertebræ overlapped to the extent of an inch, the displacement being upwards and backwards of the lower fragment.

Very shortly after admission, chloroform was administered, and reduction easily effected exactly as in the last case, the only

difference being that the reduction was accompanied by a coarse, crepitating jerk.

The treatment employed was the same as in the last case; the symptoms were the same, with this exception—this patient experienced intense pain, chiefly in the course of the nerves that had been stretched previous to reduction. To relieve this various remedies were applied with little benefit; it yielded, however, to the application of Corrigan's iron, applied at intervals along the course of the nerves.

On May 7th he was discharged, and shortly afterwards was able to resume his employment as a dock porter. The amount of thickening, after treatment, was considerably less than in the last case.

G. S—, a miner, whilst in a stooping position, was struck on the back by a large piece of falling rock. He was admitted into hospital, almost immediately after the accident, on Sept. 23rd.

On examination, it was found that the sixth dorsal vertebra was considerably displaced, and to the right side; the left leg had sustained a comminuted fracture of both bones just above the ankle; the right leg was paralysed, and priapism existed. The left leg and thigh were very remarkably sensible to touch, the least impression giving intense pain evidently quite unconnected with the fracture. He was seen immediately after admission, and the fractured leg having been previously put up, the reduction of the displaced spine was effected in the manner above described, but with considerable difficulty; the skin and muscles were so tightly stretched over the displaced bone that it required the knee of the operator and great force to get the bones in apposition.

He was put to bed; forty drops of Liq. Opii Sed. administered and the catheter passed.

24th.—Great pain at seat of fracture; abdomen very tympanitic; bladder distended; can slightly move the toes of right foot; no motion of leg. The anæsthesia of left leg about the same. Ordered a stimulating injection; catheter to be passed. Pulse 93; temperature, upper 99⅘°, lower 98⅗°.

26th.—Not so well; can move neither leg; urine ammoniacal;

motions are passed involuntarily; in an irritable and excited state. Ordered a saline febrifuge, and one of Holt's winged catheters to be introduced. Pulse 120; temperature, upper 100$\frac{1}{5}$°, lower 99°.

29th.—Greatly improved. He can slightly flex the right leg, and the extreme sensibility of the left is rapidly diminishing. Urine is excessively ammoniacal; bowels relieved by daily injections. He is not aware when the bowels act, and can retain the fæces for some time.

Oct. 22nd.—Since last date has steadily continued to improve; sat up in bed to-day for first time, for two hours; has passed a little urine naturally; bowels still constipated, requiring frequent enemata; no pain in back, and parts feel firm; can move right leg fairly; left leg quite easy in gum and chalk. Pulse 72; temperature of upper and lower extremities 98$\frac{4}{5}$°.

Oct. 28th.—Got up for first time; passed urine and fæces naturally; says he feels quite well.

Nov. 8th.—Discharged cured. A very slight nodule only over seat of fracture.

Dec. 30th.—Saw the man to-day; is in good health and walks with only a stick, has no trouble from back, but limps a little in consequence of the fracture of left leg.

EXOPHTHALMIC BRONCHOCELE.

By MATTHEW HILL, F.R.C.S., M.R.C.P.E., &c.

I have selected this subject more from the rarity and interest of the disease than from the consciousness of any ability to further illustrate it or throw new light on the vexed questions involved in its pathology, and because I have met with two well-marked examples, which shall form my illustrations, as well as one or two "incomplete" cases, but of the latter more anon. The disease is marked by a triple combination of symptoms which renders its diagnosis a matter admitting of as little doubt as a club-foot or a squint. That this triple combination, viz. palpitation, swelling of the thyroid, and protrusion of the eyeballs, did not attract attention until the late Dr. Graves, of Dublin, in the year 1835, pointed it out as indicative of an individual and separate disease is truly a matter of wonder; but I suppose we all experience this sensation when any discovery or new invention is submitted to us. In the language of Milton,

> "Th' invention all admired, and each how he
> To be the inventor miss'd; so easy it seemed
> Once found."
>
> *Par. Lost*, B. vi, 479.

There appear scattered records (much earlier than the date above mentioned) of cases which, by their intrinsic evidence, seem to belong to the disease in question; but these have been recorded either as exophthalmos with peculiar symptoms, or of diseased heart accompanied with goitre. No one seemed struck with the entity or individuality of the disease, or the peculiar bearing of its features upon one another, or of the whole upon a disordered nervous system. In consequence of Dr. Graves first calling attention to it, Trousseau and others have named the disease "Maladie de Graves;" a German writer, Von Basedow, divides

this honour with him, as Niemeyer and others have called the disorder "Morbus Basedowii;" it has also been termed "Anæmic Exophthalmos," and has been described under various other names.

But by whatever title recognised, the disease is marked by protrusion of the eyeballs (technically called exophthalmos) by swelling of the thyroid gland (termed goitre or bronchocele) and by rapid and excited action of the heart. These essential signs are generally accompanied by irritability of the digestive organs, spanæmia and defective brain power, in varying degrees. The subject of my first illustration is a lady, æt. about 30 years, of nervous temperament, yet not fidgety as such patients usually are, of spare habit, pallid complexion, and quiet demeanour. Her eyeballs are very much extruded, giving a strange, staring appearance to the eyes, from the sclerotic being more than usually exposed; the front and base of the neck are swollen to nearly one half more than the normal size, the lobes of the thyroid being tolerably well marked and communicating a thrill and pulsation to the fingers; the pulse when I first saw her ranged from 120 to 140 beats per minute on an average, but occasionally, when startled or excited, her pulse could scarcely be counted. When I ceased my attendance the average was 80 to 90 beats, by which it will be inferred that the disease was not completely cured at that time; she was, however, much better, and seemed disinclined to swallow more physic. I have seen her lately, her exophthalmos and goitre have almost if not quite, disappeared; the palpitation, however, troubles her occasionally. The heart sounds were normal except for a soft systolic bruit, and there was *bruit de diable* in the jugulars; there existed no swelling of the feet, but a disposition to dyspnœa when going upstairs, or on attempting to hurry. The digestive system was weak and capricious. The following graphic description of her case was written by herself at my request, and without any prompting of mine:

"My illness was, I believe, caused by the sudden death of my father, five years ago, which caused my heart to beat heavy and quick; what I mean by heavy is that it thumped against my side, and has continued to beat heavy and quick until this day, but

with different degrees of heaviness and quickness. About a week after the first commencement (as I believe) of my illness, my eyes commenced to protrude and have a stare in them. I lost my appetite and grew gradually weaker; and as I grew weaker, I had severe pains at the top of my head accompanied with a burning heat in the head; when the pains left the head the heat also left. The pains in the head lasted for very irregular periods, sometimes for two and at others for twenty-four hours. About three months after my illness commenced I found my neck gradually swelling, and about three months later it was at its largest. By this time I had grown very thin and weak; my weakness consisted of weakness in the limbs, of shortness of breath when making the slightest exertion, and what I may describe as a sinking of the body. The weakness was so great, and the pains in the head so severe, at some periods, that I lost the power of fully explaining my thoughts in words. After continuing in this state for some three or four months I went to Cumberland and remained there four months, when I slowly regained my appetite, and as my appetite returned my strength increased a little. I have always great heat and pain in my head when I lose my appetite. I seldom ever feel cold. I have stiffness in the joints. At the present time I have better health than I have had at any period since the commencement of my illness; before this illness commenced I enjoyed good health and was stout."

The notes of the second case have been supplied me by my friend Mr. Young, under whose care the patient has been lately; it being about twelve months since I last prescribed for her.

"Mrs. L—, æt. 29, married eleven years, has never had any children. Has suffered a great deal of anxiety for some time back. Patient is a native of the south of Ireland, but has been reared in the Channel Islands. Nine years ago she came to live in Liverpool, a few months thereafter she had pleurisy on the left side, which was followed by a very low state of health for about twelve months. This condition improved somewhat, but the patient next became subject to fits of intolerable headache. During the last five years she has suffered more or less from palpitation. Two years and a half ago, she for the first time had

her attention drawn to the condition of her throat, and six months later she noticed the prominence of her eyeballs.

"The menstrual flow had been slight, and she rarely went the month, but since that time it has been gradually diminishing. She has never suffered from dysmenorrhœa. The thyroid body increased very rapidly during the twelve months after she first noticed it, but during the last eighteen months it has been tolerably quiescent.

"About twelve months ago she suffered from some form of fever, which brought her very low, and in which she had intense headache and incessant vomiting. This was followed by ulcerated sore throat and an abscess in the meatus of the ear.

"Since the thyroid has enlarged, she has suffered from noises in the ears, so that she has to keep her hand under her head to keep it off the pillow.

"On examination we find enlargement of the whole gland, but more particularly of the right lobe, the middle being also enlarged. Pulsation of the whole mass quite visible to the eye. *Bruit de diable* sensible to the hand.

"The tumour measures 6 inches across, the right lobe being $3\frac{1}{2}$ inches, and the left $2\frac{1}{2}$ inches, the right lobe from above down $3\frac{5}{8}$ inches. The patient is highly nervous. Heart very irritable, with soft murmur at the base; a considerable quantity of dropsical effusion about abdomen and lower extremities, a somewhat albuminous look about the face. Tongue flabby and white. Pulse weak, quick, and irregular. She suffers a good deal from dyspepsia and flatulence.

"*Examination of Urine.*—No albumen, no sugar, a small mucous chord.

"*Treatment.*—Pil. Galbani comp. gr. iij, Pil. Aloes c. Myrrhæ gr. ij, M. ft. pilula omni nocte sumend., with full doses of Tr. Ferri Perchlorid. and Tr. Digitalis, and Emp. Belladon. pro regione cordis. Stopped all tea, beer, potatoes, sugar, &c., ordered a more nutritious diet, and a little brandy and soda water. This had marked benefit on the heart and pulse. Patient improved in every way. Some days later ordered small doses of Potass. Iodid. with Tinct. Cinchonæ, and I intend, moreover, applying Potass. Iod. locally."

It is to be noted that in both the cases there was as a starting-point mental disturbance; in the one sudden grief, and in the second protracted anxiety; and I believe most others will furnish a similar history. Upon this mental depression, or nervous exhaustion, follows at various intervals palpitation of the heart, then the exophthalmos, and finally the goitre; this is the general sequence, but occasionally, as in the second case, the goitre seems to precede the exophthalmos.

As the patient recovers the cerebral irritation first disappears, next that of the heart, then the orbital swelling subsides, and eventually that of the thyroid; concurrently with this improvement the sleep returns, the appetite and digestion recover tone, the emaciated body its flesh, and the blood its proper proportion of red corpuscles.

It would seem that the thyroid body acts as a break to the force of the circulation, or rather to the volume of the blood which, in consequence of the generally-dilated condition of the blood-vessels and the rapidity of the heart's action, is propelled in undue quantities towards the brain, as the labouring carotids and the loaded condition of the orbital vessels testify. It may be, also, that this state of the vessels of the orbit is wisely intended as a second diverticulum to the blood, thereby sparing the thin-walled vessels of the brain from the strains which the sudden emotions to which such patients are peculiarly liable would subject them.

As an illustration (more plausible than scientific, it must be confessed) we might look upon the vessels of the thyroid body, and perhaps those of the orbit also, as fulfilling the office which the interposed net-covered elastic ball serves in Richardson's spray-producing apparatus, namely, an equaliser and moderator of the force with which the air is to be propelled by the end ball or bellows towards the spray points: imagine the bellows of the apparatus the heart, the air the blood, the fine spray points the cerebral capillaries, the interposed elastic ball the thyroid body, and the analogy is complete, except that in the apparatus the diverticulum is placed on the direct channel, and in the disease upon a collateral or indirect channel.

A better analogy may be instanced in the *rete mirabile* on the

carotids of the Ruminants, the effect of which is to moderate the flow of blood to the brain whilst grazing. Graves compares the action of the thyroid body to erectile tissue, and suggests that the *globus hystericus*, is not merely a nervous but an actual sensation. The bruit which accompanies the systolic sound of the heart, and which may be traced into the great vessels, is at first of spanæmic origin; later on, where the chambers of the heart have become dilated with long-continued rapid work and consequently the proportion between their capacity and the area of the valves is no longer that of health, the abnormal sounds are further indicative of organic mischief, and are the precursors of cyanosis, dropsy, dilatation of the veins, and general static congestion of the body.

The associated pathology of the thyroid and the orbit is such as might be expected from the functional disturbances. When much protracted, accordingly, we find permanent hypertrophy of the vessels and substance of the gland, and disorganization of the cornea, which the eyelids no longer suffice to cover; a result to which strain upon the ciliary nerves conduces by rendering the eye incapable of protecting itself. We do not, however, meet with such extensive mischief, except as the result of great neglect. If recognised and treated in time, the prognosis is generally favorable, more especially if the symptoms have supervened quickly upon one another, the same rule applying to this as to many other diseases, namely, that the more chronic and less pronounced they are, the greater the difficulty in eradicating them from the system.

The treatment which is theoretically indicated is that which I have found practically most useful. It is in the first place to allay nervous irritability by opium, hyoscyamus, chloral, or other suitable sedative to the extent of procuring a fair amount of sleep—"Chief nourisher in life's feast." Until this be done it is useless to attempt to settle the stomach, which is often disposed to reject food, as much, I believe, by reason of influences transmitted from the brain as from debility of the organ itself.

In the next step some such mixture as the following will be indicated;

℞ Ammon. Carbon., ʒij.
Tinct. Cinchonæ, ʒss.
Liq. Bismuthi, ʒj.
Syr. Papav. Alb., ʒj.
Aquæ, ad ʒviij.
M. ʒj c. ʒss Suc. Limettæ 3tiis vel 4tis horis.
Mitte Succi Limettæ, ʒiv.

It may be remarked here parenthetically that with effervescing mixtures I generally order *lime juice*, and this for several reasons: it is as good, if not better adapted for the purpose, as either natural or artificial lemon juice; Sturge's Montserrat Lime Juice is to be found ready for immediate use in most chemists', and in many grocers', establishments, thus doing away with the trouble of buying and squeezing lemons, while it is also pretty uniform in strength. If the stomach be very qualmish three or four minims per dose of hyoscyamic acid may be added to the *juice*. The food should be light, nourishing and not stimulating, given in small quantities at a time, with ice if need be; milk and lime water, if the milk be not well borne by itself; the meat extracts and the farinaceous compounds are indicated.

These, together with quietness of mind and body, will generally bring the patient a considerable step on the road to recovery. We may now begin to use more specific treatment, by which I mean iron and digitalis. I say *now*, for it is worse than useless *beginning* the treatment with them; it is too great a measure of "reform" to be palatable to the stomach at first. But when, by the means previously indicated, the digestive organs have been "educated" up to a certain point, then this specific treatment will no longer be rejected, but will be borne more or less well in the earlier doses, and finally be productive of the benefits desired. I have found such a formula as the following amongst the most useful:

℞ Tinct. Digitalis,
Tinct. Ferri Perchlorid.,
Sp. Eth. Sulph.,
Syr. Zingiberis, āā ʒss.
M. ʒj ter in die, ex aqua capiend.

Under the most favorable circumstances the disease is not

likely to yield for many weeks, and the probability is that many months of patient and persevering treatment will be required; too often the patient gets tired of the doctor, or the doctor of the patient, before a complete cure can be effected. While upon the subject of treatment, I may remark that I do not think any external application (such as iodine) to the thyroid is of any service; a light bandage over the eyes may be worn at night, and if the protrusion be extreme, and the cornea suffering from exposure, an operation on the eyelids may enable them to cover the globe more effectually. The application of a belladonna plaster over the region of the heart may be of moral if not of actual service in the juvantia. Dr. M. Meyer, of Berlin, has recently published four cases in which brilliant results were obtained by galvanising the cervical sympathetic during a considerable time (during twenty, seventy-two, sixty, and eighty-four sittings respectively). He says the influence was also great upon the general health and upon the menstrual derangements. I have not tried this remedy and can, therefore, express no opinion regarding it. Trousseau recommends hydropathy in some cases, and I should expect it to be useful in removing the local congestions and engorgements (as of the liver, spleen, &c.) which are apt to occur in this disease. Hydropathy is besides an efficient means of equalising the circulation, or of determining it towards the skin, uterus, &c., according as it is skilfully applied.

I now come to a very interesting portion of the subject, namely, its etiology.

The origin of the disease has been variously referred to a cardiac, anæmic, and neurotic origin. Some of the Dublin physicians, (Stokes, Marsh, &c.) amongst the earliest observers, blame the heart. Begbie is one of the most eloquent advocates of the anæmia theory; but the latest opinions favour the idea of a neurosis (Niemeyer, Trousseau, &c.). To say that the disease is one of the neuroses is no more definite than to say that measles belong to the exanthemata; yet from our imperfect knowledge of nervous action, and more especially of the reciprocity of the cerebro-spinal and sympathetic systems, I doubt whether it is allowable to make a more exact statement at present. Nevertheless, there are some

well-ascertained physiological facts which seem to have a bearing on the subject.

For instance, we know that the action of the heart is mainly due to its own sympathetic ganglia, controlled by a nervous stream from the cerebro-spinal system, mainly through the pneumogastric nerves. It is true that these pneumogastrics by the time they reach the chest are largely blended with fibres from the cervical ganglia, but in the main they may be taken to transmit cerebro-spinal influence. We know that division of the pneumogastric permits the action of the heart to be *increased*, presumably from the then uncontrolled influence of the sympathetic; also that irritation of the pneumogastric *retards* the action of the heart; presumably this irritation causes a temporarily increased flow of *vis nervosa* from the brain, whereby for a time the influence of the sympathetic is overpowered.

It seems to me, then, a fair deduction to say that in this disease either the action of the pneumogastric (which, as we have seen, is of a controlling and retarding nature) is in a depressed condition, or that the sympathetic is in a condition of increased activity. Observant of the general asthenic character of the disease, I am not disposed to accept the latter hypothesis, which involves the generation of increased force in the sympathetic system; I am rather disposed to think that the ganglionic force being the same is no longer controlled—is allowed to run riot, as it were, by reason of the depressed action of the pneumogastrics transmitting but feeble influences from the impoverished brain. The history of mental anxiety, grief or worry, which we generally receive from subjects of this disease, and the results of the tonic treatment I have mentioned, would seem to confirm my views. As to the apparently contradictory results, theoretically considered, of Dr. Weber's treatment, viz. galvanising the cervical sympathetic, I am not sure that a closer knowledge of his method would not establish the fact that the application of the current to various regions of the neck stimulated the pneumogastrics more effectually than the sympathetic. Or it may be supposed that the galvanic current supplied to the ganglia a controlling force analogous to, if not identical with, the ordinary nervous current transmitted by

the vagi, but which, as I believe, is deficient in this disease. Adopting this view, the results of Weber's treatment would appear to confirm the hypothesis I have ventured to put forth. I do not wish to magnify this hypothesis to the dimension of a theory, the dearth of our knowledge as to the relations between the sympathetic and cerebro-spinal systems rendering it a rash matter at present to erect anything very elaborate in the shape of a theory which future observations and experiments might destroy and make a heap of ruins, the *débris* of course being proportioned to the amount of superstructure. I shall be content if by this hypothesis I shall have rendered a conception of the phenomena of the disease something more apparent and less confusing.

The exophthalmos has given rise to some controversy; but without entering into a discussion upon the various ideas that have been broached, I will merely state that engorgement of the deep-seated veins of the orbit, branches of the ophthalmic vein, appears to be the primary cause of the extrusion of the eyeball. It will be remembered that branches of the sympathetic from the superior cervical ganglion through the carotid plexus, ramify on or near the cavernous sinus, thus offering some explanation of the varying degrees of exophthalmos which a patient may present during emotional excitement, or in quiescence. Later on in the disease this continued disturbance of the circulation gives rise to hypertrophy of the cellular and fatty tissue in the orbit, and renders the extrusion more permanent. The choroid and retina partake of the congestion, though but to a small extent, as the sight is not generally much affected.

The condition of the thyroid is very different to what obtains in ordinary goitre, the gland is generally hypertrophied, of a fibrous structure, cysts are seldom found, but the arterial supply is very largely increased. The thyroid arteries are much developed, and anastomose freely by dilated branches, in fact the enlargement is mainly vascular, whilst in endemic goitre the increase in size is due to a general hypertrophy of the normal structure of the gland.

I have incidentally mentioned in the beginning of this paper that some cases of this disease are *incomplete;* that is to say, that

one or more of the three ordinary phenomena may be absent, as the goitre, or the exophthalmos, rarely the palpitation; and I am convinced from this cause many cases of the diseases are not recognised by practitioners. Not long ago I attended a young married lady for an attack of temporary monomania. The peculiar staring and extruded eyes attracted my attention, and upon questioning her husband I elicited that, about a year previously, she suffered from severe palpitation of the heart, supposed to be of rheumatic origin, but I could find no trace of disease in the heart upon the closest examination. I also ascertained from herself that her throat used to be at times slightly larger than usual. The only symptom which now remains is the exophthalmos, the heart's action and rhythm are correct, the throat is not larger than is natural, and her mind has recovered its healthy tone. I do not think it is overstepping the bounds of fair deduction to infer that the defective brain-power which was evident in the production of the insanity had existed, perhaps in a different degree, in her previous illness, and permitted the development of the sympathetic disease in an incomplete form. Trousseau mentions one case in which nervous excitement was at times so great that insanity was feared; and in another that the patient's father was an epileptic.

I have never had the opportunity of seeing the post-mortem appearances in a subject with this disease; but details on this point may be found in the 'Dublin Medical Press' for July, 1859, being a translation, by Dr. W. D. Moore, of a very able memoir by Dr. Withusen, a Dane. The appearances are such as might be expected; viz., structural changes of varying degree and intensity in the heart, thyroid, and orbit, sometimes atheroma in the arteries or aneurismal dilatations in the arteries of the brain and thyroid, and more or less change in other organs, as the liver, spleen, and kidneys, evidently the result of chronic congestion or other disturbance of the circulation.

In conclusion, I do not think the coarse structural changes which have been found in the cervical sympathetic ganglia are the cause of the disease; I am rather inclined to consider them the result of protracted functional disturbance, and analogous

in this respect to what obtains in the heart, thyroid, and orbit.

It is almost needless to say the disease is most common in females, and that the right lobe of the thyroid is generally the largest, probably because it is naturally slightly larger than the left.

The cause of the disease attacking females most frequently may be set down to the greater excitability and tendency to derangement of their nervous system; the thyroid, too, has been known to reciprocate in some degree with menstrual irregularities.

NOTES ON TEMPERATURE IN SURGICAL CASES.

By W. MACFIE CAMPBELL, M.D., Liverpool.

In his introductory address delivered at the St. George's Hospital, Session 1868-69, Professor Acland, of Oxford, said he was glad that medical science was becoming every day more mathematical, and looked forward to the day when medical facts would be expressed with arithmetical simplicity.

I only hope the following generalisations, prepared from notes of cases, may not be considered too arithmetical.

The Correlation of Temperature, Pulse, and Respiration.

In surgery as in physic, with a high temperature, we have, as a rule, a correspondingly rapid pulse and respiration. When studying this correlation it is needful to attend to the following simple rules.

1. Take the pulse and respirations before taking the temperature, and before dressing or otherwise disturbing the patient.

2. Count the respirations more than once during an entire minute.

3. Divert the patient's attention from the respiratory function, and,

4. If excited, do not record the pulse, but wait.

The two last are most important. I have the notes of one case in which with temperature 102°, if spoken sharply to, the pulse rose to 140 or 150, the respiration to 70 in the minute. The following table, prepared by the analysis of a large number of cases from my own notes and from various journals, shows the average of the pulse and breathing, their extremes at each temperature, and the proportion between one and the other.

Temperature.		Pulse.			Respirations.			Proportion
Fahr.		Mean.	Highest.	Lowest.	Mean.	Highest.	Lowest.	Pulse-resp.
97°	corresponds to	84	116	52	14	14	...	Nearly 6 —1
98°	„	88	136	56	19	24	14	4½—1
99°	„	92	128	64	22	40	15	4½—1
100°	„	96	144	64	25	38	16	3¾—1
101°	„	103	140	72	27	32	14	3¾—1
102°	„	106	150	72	28	40	20	3¾—1
103°	„	115	148	80	27	40	20	4¼—1
104°	„	119	160	72	28	32	22	4¼—1
105°	„	130	144	80	31	44	28	4⅛—1

There is sufficient here to show how ridiculous any hard and fast rules would be; at the same time with each increase in one we have a closely corresponding increase in the others, and up to and under temperature 102° (the safety limit of Prior), the increase occurs with almost mathematical precision. Temperatures of over 105° are very fatal and seldom last long, the only exception being in erysipelas, in which a temperature of 106°—107° is not uncommon, often without a correspondingly high pulse.

In health the proportion borne between pulse and respiration is stated generally at 4 to 1 in the adult; this proportion, as will be seen, is not materially influenced by disease, except, contrary to what one would suppose, in low temperatures.

Rare instances of complete correspondence between temperature and pulse occur. I have recorded such a case ('Lancet,' Sept., 1873) in which the slightest variation in the one was synchronous with a like variation in the other. In this case the temperature 99°, corresponded to pulse 70, each degree Fahr. to 10 pulse beats, and further each tenth of a degree to one pulse beat, till the highest point, temperature 106°, pulse 140, was reached. A single day's observation from this interesting case (one of chronic pyæmia after amputation) will illustrate my meaning.

March 6th.—M., temperature 102·2°; pulse 102. V. temperature 105·2; pulse 132.

Effects of Drugs on Temperature and Pulse.

I have noted the effects of the five following drugs, with results in no way differing from those described by others.

Aconite (Tinct.) . .	1st case, caused fall in temperature	2·8°,	in pulse	40.*
Do. in mij doses .	2nd case	„	„	1°	„	12.
Digitalis (Tinct. mv)	„	„	„	1°	„	16.
Quinine	1st case	„	„	1°	„	12.†
Do.	2nd case	„	„	·2°	„	2.
Do.	3rd case	„	„	1°	„	...

Bromide of potassium seemed to have a very slightly depressing effect.

Carb. of ammonia, with chloric ether, caused a rise of temperature 1·6°, pulse 20.

The Temperature in Typical Operation Cases.

The following rules may be given:

In Recovered Cases.—1. The temperature does not fall below normal, nor rise much above 103° (mean extreme 102·5°).

2. The highest temperature occurs on the second or third day.

3. Almost uniformly, temperature rises morning to evening, and falls evening to morning.

4. One observation seldom differs more than two degrees from that preceding or following it.

5. Temp. descends to normal during the third week (or in favorable cases earlier) except in chronic cases.

The following may be taken as a typical thermal case.

Case I.—Alfred L—, æt. 13. Lacerated right arm. Amputation below shoulder, Oct. 14th, 1871. Cured.

Date.	Temperature. Fahr.	Date.	Temperature. Fahr.
Oct. 14 (amputation)	102·4°	Oct. 19	M. 100·6°. V. 100°
„ 15	M. 102·4°. V. 102·8°	„ 20	M. 100·8°. V. 100·2°
„ 16	M. 102·2°. V. 102·8°	„ 21	M. 99°. V. 101°
„ 17	M. 100·8°. V. 100·2°	„ 22	M. 100°.
„ 18	M. 100·7°. V. 100·4°	„ 23	M. 99·4°. V. 98·4°

* See paper by Dr. Buzzard, 'Practitioner,' vol. ii, p. 127.

† See Report of Drs. Murchison, Symes Thompson, and H. Weber to the Clinical Society.

In Fatal Cases.—1. The temperature may reach any point between 97° and 106° or even higher (mean extreme 104·7°).

2. Though the temperature is high on the third and fourth days, it is exceeded by the death temperature.

3. The rhythm of rise morning to evening, and fall evening to morning, is frequently broken.

4. The increments of rise or fall are very great, a difference of five degrees being not uncommon between one observation and another.

5. The temperature rises in the third week towards death.

The following is fairly typical, excepting rule 4.

Case II.—William H—, æt. 45. Injury to arm. Amputation above elbow, Oct. 13th, 1870. Died, Oct. 28th, 6 p.m.

Date.	Temperature.	Fahr.	Date.	Temperature.	Fahr.
Oct. 13 (amput.)	M. 100°.	V. 101°	Oct. 21	M. 100°.	V. 100·6°
„ 14	M. 101·4°.	V. 102·4°	„ „ Rigor.		
„ 15	M. 103·3°.	V. 102·5°	„ 22	M. 101·7°.	V. 100·7°
„ 16	M. 103·2°.	V. 102·7°	„ 23	M. 101°.	V. 100·5°
„ „ Secondary hæmorrhage.			„ 24	M. 101°.	V. 103°
„ 17	M. 101·7°		„ „ Rigor.		
„ 18	M. 103°.	V. 101°	„ 25	M. 102·5°.	V. 101°
„ „ Rigor.			„ „ Rigor.		
„ 19	M. 100·2°.	V. 102·3°	„ 26	M. 102·6°	
„ „ Again hæmorrhage.			„ 27	M. 103·8°.	V. 104°
„ 20	M. 101·3°.	V. 101°	„ 28	M. 105°.	V. 105·6°

Exceptions.—1. Death may take place at the end of the first week with a high temperature; as for example:

Case III.—J. H—, æt. 30. Compound fractured leg, Feb. 22nd, 1871. Amputation March 31st. Death April 7th.

Date.	Temperature.	Fahr.	Date.	Temperature.	Fahr.
March 31 (amput.)	M. 105·8°.	V. 103·8°	April 4	M. 103°.	V. 103·4°
April 1	M. 105°.	V. 103·8°	„ 5	M. 105°.	V. 101°
„ 2	M. 102·6°.	V. 103·4°	„ 6	M. 102·6°.	V. 105°
„ 3	M. 103·4°.	V. 103·4°	„ 7	M. 105·4°	

2. Death may take place at the end of the first week with a low temperature; as for example:

Case IV.—A. C—, æt. 19. Lacerated foot. Amputation Nov. 22nd, 1870. Died Nov. 30th.

Date.	Temperature. Fahr.	Date.	Temperature. Fahr.
Nov. 23	M. 101·2°. V. 101°	Nov. 27	M. 100·2°. V. 100·3°
„ 24	M. 102°. V. 98·4°	„ 28	M. 99·6°. V. 98°
„ 25	M. 102·8°. V. 102°	„ 29	M. 98·2°. V. 97·5°
„ 26	M. 101·3°. V. 101°		

These exceptions owe their difference, in the first to the length of stay in hospital (five weeks) before operation, in the second, a primary amputation, to constitutional causes. Death in the first was from pyæmia, in the second from tetanus.

Safety Limits of Temperature.

In a paper in the 'British Medical Journal' (1868, vol. i, p. 451) Dr. C. E. Prior gives the temperature of 102° as the "safety limit" in general. To test this observation I have compared all the cases I have with the result of a striking corroboration of Dr. Prior's views; from the analysis of my cases the general safety limit seems to be 102·7°; the difference being probably due to the small number of cases I have.

Subjoined is a table to show the mean extremes in fatal and recovered cases. With one slight exception fatal cases show both higher and lower temperatures than recovered.

Nature of case.	Cured.			Died.		
	No. of cases.	Mean highest.	Mean lowest.	No. of cases.	Mean highest.	Mean lowest.
Fractured skull	4	102·8°	98·2°	5	104·1°	97·9°
Operations	14	102·5°	98°	10	104·7°	97·3°
Compound fractures ...	4	102·2°	98·5°	5	105·3°	98·2°
Simple fractures	2	100·4°	98·3°	...	...	...
Erysipelas	3	105·7°	97°	...	...	...
Pyæmia	...	...	...	5	104·9°	97·3°
Mean.....	27	102·7°	98°	25	104·7°	97·5°

Erysipelas upsets all rules; the excessively high temperature so often found does not seem to mark the same danger to life as in other diseases.

In surgical disease the temperature is most frequently found between 99° and 100°; then between 100° and 101°; then 101° and 102°; next 102° and 103°; then 98° and 99°; next 104° and 105°. Temperatures above 106° and below 97° are about equally infrequent.

Temperature of 99°—100° contains $\frac{1}{4}$ of all observations.

Temperature of 99°—101° contains $\frac{1}{2}$ of all observations.

BRIEF PRACTICAL REMARKS ON INJURIES TO THE HEAD.

By HENRY LOWNDES, L.K.Q.C.P.I.,
SURGEON TO THE LIVERPOOL NORTHERN HOSPITAL.

I PROPOSE to make a few remarks on the phenomena that occur in certain injuries to the head. A long experience at the Northern Hospital has impressed various points upon me, and to these I shall briefly draw attention. My remarks may possibly be useful to those who have occasionally to treat such cases, but who may not see them sufficiently often to enable them to trust to their own experience, though I fear I have nothing very new to propose, and nothing to say that has not been said better, but perhaps less concisely, by others.

Fractured base.—Effusion of blood immediately underneath the conjunctiva of the eyelid of one or both eyes has been of late considered pathognomonic of fracture extending into the base, but I had recently under my care a young man who had this symptom very well marked, and who had also lost blood from one ear, yet there could have been no fracture, for in two or three days he was perfectly well. I have, however, often seen this symptom where the fracture undoubtedly did exist, and it ought, no doubt, to have its place among other important symptoms.

If we cannot always judge with certainty on the patient's admission as to the base being fractured or not, we are put out of doubt in a very few days if the patient revive from the first collapse. If there be a fracture, when reaction comes on sharp febrile symptoms set in, heat and pain in the head, delirium aggravated at night and often most violent, the patient screaming and howling all night. This often passes into a typhoid condi-

tion, muttering delirium, sordes, perhaps paralysis, and either death or a slow and protracted and rarely perfect recovery.

If the progress of the case be not somewhat like this, though perhaps less grave, I should strongly doubt the existence of fractured base.

Recovery from fractured base.—I do not remember ever having seen, among my own patients, more than one case of perfect recovery from well-marked fracture of this kind, and in that case a copious discharge of limpid fluid from one ear left little doubt of the nature of the injury. His illness was long and alarming, his recovery complete.

I have, however, seen several cases in which life remained, but life more or less damaged. In some cases paralysis of one side of the face is left, and does not seem amenable to treatment. In others the mind is left damaged, and the patient remains half-witted, cunning, and mischievous and intractable, or fatuous, unclean in his habits, and with imperfect control of the sphincters.

Treatment in fractured base.—When the stage of concussion begins to pass away we may hope to lessen the coming reaction by calomel purgatives. When insomnia and high delirium come on ice must be freely applied to the shaven scalp, and in a day or two free blistering often proves most useful. The whole scalp may be blistered one day, and on the next the nape of the neck and the spaces behind the ears, and as the parts heal the process may be repeated over and over again. I have seen the most marked effect thus produced both in allaying maniacal excitement and in rousing from stupor. The bowels are now most difficult to move, and calomel in large doses, croton oil, or colocynth enemata must be administered. The relief they give is often marked. Meantime milk, beef tea, and ice must be given freely, and if necessary nutrient enemata. I usually abstain entirely from giving stimulants in head cases until the inflammatory stage has passed away, but, of course, if signs of sinking appear a little brandy must be given.

By treatment of this kind I believe life is not unfrequently saved in fractures of the base, but the course of the illness is

always long, the state of the patient always alarming, his condition on discharge almost always unsatisfactory.

Fracture of vault of skull without scalp wound very exceptional.—A central depression of the scalp with a raised hard surrounding circle of tissue often gives to the finger a feeling of a depressed fracture of the skull, which is well known to be deceptive. As the effused blood or lymph is absorbed the swelling and the depression alike disappear. As a rule, where we see no injury to the scalp we need not fear any fracture unless of the base, and still less any depressed fracture, but I have seen the following remarkable exception:—A young man *walked* into the hospital and said that he had been struck violently by a plank; the skin of the forehead was just grazed. He was put to bed, and had not been long there before he was seized with convulsions. I at once made a free incision on the left brow, and exposed a most extensive irregular ragged fracture extending evidently down through the orbit to the base, and in two separate places depressed and driven quite through the lacerated dura mater. The depressed portions were removed with temporary relief, but the patient died in a day or two.

Depressed fracture.—In depressed fracture in civil practice we generally find the depressed bone is a piece of limited size. As far as the outer table is concerned we may perhaps find a mere slight hollow, a fissure, or else one edge of the fracture a little lower than the other, while one or both of the edges of the inner table may be extensively shattered and depressed. The dura mater is often bruised, and sometimes lacerated. We can often be guided, when the examination of the wound leaves room for doubt, by the nature of the accident. Depressed fractures are generally caused by a sharp blow with some not very heavy substance, such as a half brick or stone, a jug or tumbler, or by a fall upon some pointed substance; a sharp kick from a horse is a not unfrequent cause. If we find there has been very great violence used, such as in a fall down a ship's hold, or from a house top, or in some very heavy substance falling upon the head, we shall generally have fracture of the base. In these latter cases if we feel a depression of the exposed bone we have only to enlarge the

external wound in the course of the fracture to find how hopelessly extensive the fracture is. In a case from which was taken the most beautiful specimen I ever saw of greatly depressed starred fracture of the inner table, with a mere dimple of the outer table, the injury had been inflicted by a blow from the bottom of a tumbler that had been hurled at the patient by another woman. The patient was only admitted several days after the accident, when abscess of the brain had formed which found its way into one of the lateral ventricles and proved fatal.

Treatment of depressed fracture.—In military practice it is now, I believe, the rule not to interfere with depressed fracture. Now, of course, in warfare these fractures must generally be gunshot wounds, the bones will probably be shattered, and any pieces that are driven into the brain will not be firmly impacted among and locked in by the surrounding bone, as in the cases we generally see in civil hospitals, but may readily come away or be removed as the processes of suppuration and granulation go on. Hence, I presume, the success of this practice. The same practice, I am afraid, is far too common among our civilian brethren, but I am strongly of opinion that, in cases such as I have been describing in civil practice, to leave a piece of bone pressing on the dura mater and so on the brain, and perhaps even entering the substance of the brain, is to condemn the patient either to speedy death or to a very precarious life. If abscess do not take place, epilepsy may come on even years after, or the patient may become maniacal on the first excess. We know also how futile operative proceedings generally are in these cases if delayed until symptoms of abscess occur.

I believe it is proper always to try to elevate or remove the depressed portion whenever there is a wound leading to the bone and decided depression can be felt, and we have no reason to suspect that the fracture extends to the base.

Operation.—In nine cases out of ten this removal or elevation can be effected by means of large, strong, sharp bone forceps curved in the blades, so that the point of the lower blade can be got well under the edge of the sound bone. A small triangular piece must be cut out and then the lever can be inserted under

the depressed bone and the sound bone used as a fulcrum. Sometimes, as when the skull is very thick, this is a tedious and difficult process. It is when the injury to the outer plate is not great and we believe the inner plate to be seriously depressed that we have to apply the trephine.

As to the question of removing or merely elevating the depressed portion the old rule holds good of never removing more of the skull than is necessary, but it is always well to remove enough bone to allow a finger to be passed in, that we may examine the state of the dura mater, and also satisfy ourselves that there are no sharp corners or fragments of bone left that may irritate that membrane.

On incising the dura mater.—If the dura mater be much bruised or scraped, or at all wounded, I believe it to be good practice to incise it freely the whole extent of the opening in the bone, which I have done in more than one instance. When the dura mater is at all injured, and inflammation follows, this tough membrane, like the fascia lata on the outside of the thigh, is very apt to slough, as unable to bear the least tension, and free incisions at first will prevent this, and will also give vent to any matter that may form under the dura mater. I have seen no harm follow this practice, and in one case I felt satisfied that an abscess did find vent through an opening thus provided.

Wound of dura mater or brain.—A laceration of the dura mater or of the brain-substance itself no doubt must add somewhat to the gravity of these cases of depression, but I do not think very seriously so, provided a sufficiently large opening be left in the bone to give free vent to discharges, and all irritating spicula of bone be carefully removed.

Treatment after the operation.—Water dressing to the wound, and after a day or two a light poultice, unless the antiseptic treatment be preferred. Light nourishment, with complete abstinence from stimulants as a rule. Perfect quiet. If any sharp inflammatory symptoms come on, ice to the head, calomel in large doses, blister to nape of neck, &c.

Case of depressed fracture.—I published in the 'British Medical Journal' of July 7th, 1866, seven cases of fracture with depres-

sion, in one of which trephining was performed and in the rest the bone forceps was used. Since that time I have met with very few cases suitable for operation, but I may refer to one very interesting case in which curiously enough the immediate cause of the depression was also the cause of life being preserved. I have mentioned a fall into a ship's hold as one of the most common causes at this hospital of fractured base, but in the case I am about to mention an iron bolt projecting a short distance from the kelson acted exactly as a buffer, drove a circular piece of bone down upon the brain, but broke the shock which must otherwise have been fatal.

Catherine H—, æt. 48, a very stout, square-built person, wife of a tradesman in this town, was admitted into the Northern Hospital on July 18th, 1867, suffering from a compound depressed fracture of the skull, caused by her having fallen into the hold of the Cunard Steamer Australasian, one of our largest Atlantic steamers. Her head had struck upon a sharp projecting bolt or rivet head, and it was found that a circular piece of bone of about an inch diameter had been as it were punched out of the skull, which was unusually thick, and driven in upon the dura mater. With some difficulty I removed this piece by cutting out a small portion of the circumference of the hole in the bone and so getting a lever under the piece that had been driven in. She was quite insensible all the time. The dura mater was very little injured.

She remained for some days in a very critical condition, and the state of concussion did not pass off until the sixth day, when she became sensible. She still remained very heavy and stupid until the twelfth day, when considerable hæmorrhage took place in the night. It was readily arrested and did not recur. The loss of blood relieved her head in a marked manner, and she now rapidly improved and was discharged nearly well on August 30th. I have seen her several times since and she has remained well and able to attend to business, but with rather an apoplectic look and a tendency to giddiness if she looks upward or turns her head quickly.

Insanity following concussion.—I have met with two cases in

which profound and long-continued concussion was followed by a state of mania. There was in both cases a short interval between the passing away of the stupor and the commencement of the mania. In both cases the insanity was of a mild and harmless character, free from homicidal or suicidal tendency. The patients have delusions; they think they are among their horses or at their work and talk away accordingly. They take their food well and their general health is good. I have not had opportunities of watching these cases long enough to say what the prognosis is, but I should think as reparative changes take place in the brain we might expect a gradual improvement. The insanity forms a marked contrast to that dementia I have alluded to as sometimes following fracture of the base.

In concluding these few remarks I may be allowed to acknowledge the indebtedness every hospital surgeon must feel to Mr. Prescott Hewitt's admirable article on "Injuries to the Head," in 'Holmes's Surgery.'

CANCER IN THE INFANT.

By Dr. OXLEY,
PHYSICIAN TO THE LIVERPOOL INFIRMARY FOR CHILDREN.

The following instances of cancer in the *infant* have come under my notice at the Children's Hospital, and although cases of this disease have been recorded from time to time, yet they are of sufficiently rare occurrence to make the relation of any additional cases interesting. That they are rare is I think proved by the fact that, during the time I have been connected with the infirmary, now nearly eleven years, 44,000 patients have presented themselves, and out of this number only four cases have been observed; one of these came under the observation of my friend Dr. Rawdon (cancer of the testicle) and was afterwards lost sight of; the other three were seen by myself and will be detailed in this paper. I have looked over the whole of the published 'Transactions' of the Pathological Society, and have been able to find therein only two cases of cancer occurring during *infancy*.

Case 1.—Alfred G—, æt. 5 months, admitted January 18th, 1870. Plump, healthy-looking child, has one sister, older than himself, in perfect health; mother also very robust and healthy in appearance.

Mother states that five weeks ago she noticed a swelling in his belly, commencing below the ribs on the right side, which gradually increased to the present time; the child never seemed to suffer any pain, but has several times been jaundiced. On examination a large tumour was observed extending from beneath the ribs onthe right side to the level of the crest of the ilium, and

inwardly across the abdomen. Considerable pressure did not cause pain. The tumour felt hard and was dull on percussion. Distinct fluctuation was felt midway between the umbilicus and lower end of sternum; here also the tumour was most prominent. There was no discoloration of the skin; fæces have varied in colour; urine secreted in normal quantity and quality. The child remained under observation for two months when he was attacked by violent vomiting and purging, the tumour meanwhile increasing rapidly. March 26th, the child died in convulsions.

Post-mortem twelve hours after death.—The abdomen was opened and a tumour of the right kidney was removed weighing 25 oz. The spleen was covered with recent lymph, and the cavity of the peritoneum contained a small quantity of grumous fluid. The left kidney was healthy, but about double the usual size. The tumour consisted of the right kidney infiltrated with encephaloid cancer: the fluctuating portion proved to be a large cyst; the ureter was pervious, but little of the kidney structure remained. Dr. Braidwood in his paper on "Cancerous Disease of the Kidney"* refers to this case, and gives a drawing of its microscopical appearances.

Case 2.—Mary W—, aged 5 months, admitted February 25th, 1873. Fairly nourished child with muddy complexion, mother and father healthy.

Mother states that when the child was three months old, a lump appeared in front of abdomen just below the sternum; soon it moved to the left side over the ribs in front. I found on examination a fluctuating swelling above the umbilicus, which could be emptied on pressure, the contents finding their way up to the situation of the swelling on its first appearance. There being some doubt about the character of the tumour, the child was placed under chloroform, and the tumour was found to be connected with the liver. The fluctuating portion was punctured with the aid of the aspirator, but only a small quantity of bloody fluid was obtained: this on examination under the microscope was found to contain cells such as are usually met with in cancerous growths.

* 'Liverpool Medical and Surgical Reports,' vol. iv.

The edge of the right lobe of the liver could be plainly felt; on the left lobe the cancerous growth was very easily made out. The tumour increased rapidly; the child became emaciated; latterly general œdema was present, and on April 8th death took place from exhaustion.

Post-mortem twenty-four hours after death.—On opening the abdomen I found a large quantity of bloody serum and a cancerous mass springing from the left lobe of the liver; the gall-bladder was also the seat of this disease, the liver and cancerous mass weighed together 36½ oz. The cancer was of the encephaloid variety, was nodulated on its surface and very vascular. The right lobe of the liver was pale and had evidently been subjected to great pressure, being folded into rugæ. A section of the tumour gave much the same microscopical appearances as the fluid obtained with the aspirator.

Case 3.—In this case, as I have unfortunately mislaid my notes, I must quote from memory.

The child was at the breast, and was brought to the infirmary on account of what looked exactly like a "black eye." I at first thought that the ecchymosis had been caused by a blow; but on closely questioning the mother I learnt that it had come on three or four days before, getting deeper in colour each day. I kept the child under observation for some weeks, during which time the eye began to protrude, the iris was widely dilated, the globe filled with malignant deposit, the face and temple became swollen, and a mass of cancer burst through the orbit. The child died of exhaustion. No *post-mortem* was allowed.

Case 1, when presented at the hospital was very readily made out to be cancerous; but whether of the liver or kidney it was difficult to say, as the tumour extended upwards and was continuous with the liver.

In the second case the difficulty was greater. The history of a swelling on the ribs made one suspect abscess; this was strengthened by the fact, which the examination after death failed to explain, that on pressure the tumour at the umbilicus could be completely emptied: it was with a view to explore for

pus that the child was placed under chloroform. This latter proceeding in the case of children should always be adopted, as it is impossible to thoroughly examine the belly of a crying child without its assistance. When under chloroform all the viscera can be thoroughly examined.

The third case is another example of the great difficulty in distinguishing this disease in its first stage. The only plan is to wait before giving an opinion, as a short time will suffice to clear up the difficulty.

One case which has come under my notice, in which the liver, kidney, and more especially the spleen, were very greatly enlarged, is worth mentioning in order to show the differences which exist between simple enlargement and cancerous degeneration of these organs. The child was brought to me suffering from emaciation and a large tumour of slow growth under the ribs on the left side. This on examination was found to measure six inches by four and a half inches; it was smooth on its surface, free from tenderness, with a sharp and well-defined edge and was in the situation of and shaped like the spleen. In this case there was no difficulty in forming a diagnosis either by Dr. Gorst, whose case it was, or by myself, and we confirmed our opinion at the *post-mortem* examination.

When therefore we find an abdominal tumour in an infant, in the region of the kidney or liver, irregular in its outline, fluctuating at a point or points, increasing with great rapidity and giving little inconvenience except by reason of its volume, we may safely say that it is cancerous degeneration of one or other of these organs. In order to ascertain which it is, the child ought always to be placed under chloroform and a careful manual examination made.

With regard to the relative frequency of this disease in the liver and kidney, I have reason to believe that the latter is the organ most usually attacked. The treatment of course is only palliative: in cancer affecting the testicle and cancer of the hand it is on record by Bryant and Holmes that removal cures the disease. In the encephaloid cancer of infants the glands seem never to be affected.

ON THE DEFINITION OF TUBERCLE.

By JAMES ROSS, M.D., Waterfoot, near Manchester.

The following attempt to define tubercle was made for my own personal satisfaction after reading the memorable debate at the Pathological Society, "On the Anatomical Relations of Pulmonary Phthisis to Tubercle of the Lung." No one will deny that the addresses delivered upon that occasion were characterised by great ability, but after a careful perusal of them, there was left in my mind a sense of vagueness almost amounting to confusion. I should have thought that the fault lay entirely with myself, had I not found that most medical men with whom I came in contact at the time gave expression to the same sense of bewilderment amongst the mass of details, and the apparent contradictions between the different views entertained. A careful study of that debate convinced me that the differences of opinion arose, not so much respecting the facts,—not even entirely regarding the interpretation of facts,—but in great measure from want of a mutual recognition of the exact meaning of the terms employed. I am not so presumptuous as to think that the following definition will be generally accepted, nor is it advanced as containing new views regarding the nature of tubercle; but a careful attempt to define the term, however unimportant it may be in itself, will be attended with considerable advantage, and may help to evoke more order in our mode of conceiving the subject. Even on the supposition that the definition is objected to in its entirety—in this instance a large portion of it is borrowed from such good sources that this is not likely to happen—I should still be entitled to ask my opponent upon what principle the objection is made; and if he succeed in enunciating an intelligible principle for our guidance in framing

the definitions of pathological morphology, it will be a clear gain to the science. If, on the other hand, some of the elements of the definition only are objected to, these may be modified, or omitted and replaced by others, so as to bring the definition finally into conformity with the highest knowledge we possess of tubercle, and a definition, however perfect it may be, can never be in advance of our knowledge of its subject-matter.

What, then, is tubercle? Is it a growth? Even upon this simple point there is by no means unanimity of opinion. But the difference of opinion in this instance manifestly arises from want of agreement regarding the definition of the term "growth" as employed in pathology. Some appear to think that in pathology *growth* is only applicable to cancer, sarcoma and to tumours generally; and, if this be the accepted meaning of the term, to call tubercle a *growth* is to affirm that it has greater affinities with tumours than with inflammatory products. It is very apparent, however, that those who maintain that tubercle is a *growth* give to the latter term a much more extensive meaning; but, since I do not know the exact sense in which it is used by others, I must proceed to define it for myself.

Anything is said to grow when it increases in size, and whatever grows by the addition of new material may etymologically be called a growth. In this sense, therefore, there is a pathological growth whenever a diseased part or a diseased product increases in size by the accumulation of new material. This definition, however, is not sufficiently precise. Passing over the term abnormal and its correlative normal as sufficiently definite for our purpose, the definition does not exclude inorganic concretions within the body, and great confusion would arise were these admitted into the list of pathological growths. Inorganic concretions may, however, be excluded by saying that a pathological growth is an abnormal increase of the size of a part of the body through the accumulation of *organic* material. But in tubercle, though there is an accumulation of organic material at certain localities, there is often little or no increase of bulk. If, therefore, tubercle is to be called a growth we must leave the increase of bulk out of the definition, and consider any abnormal accumulation of organic

material in a certain locality a growth whether it be or be not accompanied by augmentation of bulk. This amendment rescues us from one difficulty only to land us in others. When the stomach is overloaded by food there is an abnormal accumulation of organic materials, but no one would be inclined to call this a growth. In hæmorrhagic effusions such as pulmonary apoplexy there is an accumulation of organic material at a certain locality, but this also is not a growth in the general acceptation of the term. But if we say that a pathological growth is an abnormal *assimilative* accumulation of organic materials at a certain locality of the body this difficulty will be met; since neither excess of food in the stomach, nor hæmorrhages, are the result of a process of assimilation, while, on the other hand, there is a distinct process of assimilation in the formation of tumours, tubercles and all inflammatory products. But should not the meaning of the term be restricted still further?

There is a very general undercurrent of belief that a new growth should have a certain degree of individuality and coherence. If these elements are added to the definition most inflammatory products will be excluded. The disadvantages of this proceeding are, not only that tubercle will be included and pus excluded from the definition, and thus separated from their natural connections, but that what are called chronic inflammatory exudations and pus will also be separated from each other. I see no alternative, therefore, but to leave individuality and coherence out of the definition. A *growth*, therefore, according to this definition, will include tissues having incoherent units like pus as well as those having coherent units like cancer, and pus will come within the range of this definition when it is formed even on a free surface, since not only is the tissue from which it is formed tumefied, but, however little pus may adhere to the surface, it is still an assimilative accumulation of organic materials. And if pus is included in the definition, there is no reason to exclude the tumefactions of erysipelas, the pustules of small-pox, and even the minute red points of scarlet fever. I shall define a pathological growth, therefore, as an abnormal assimilative accumulation of organic material in a certain locality of the body, and it is only in this enlarged

sense of the term that I could consent to call tubercle a *morbid growth*. Our problem now is to differentiate tubercle from other kinds of growths.

The growths which come under the usual denotation of tubercle have loosely adherent units, so that if they formed upon the surface of the body they would soon become detached. It may, therefore, be expected that a tubercle cannot form upon either the external or internal surface of the body;—I say, as a general rule, because, although it would be impossible for a tubercle to maintain itself upon a surface of the body which is freely exposed to external incident forces, yet there are certain infoldings of the surface in which this would be quite possible. In the bronchioles for instance, which are lined by infoldings of the membrane covering the internal surface of the body, it might be possible for growths similar to tubercles to maintain themselves. And, indeed, bodies are found in the alveoli of the lungs so similar to the growths which are by common consent denominated tubercles that they can scarcely be distinguished from each other. Must the morbid bodies found in the alveoli be included in the definition of tubercle? It is generally admitted that on clinical, ætiological and anatomical grounds it is better to exclude these alveolar accumulations. It may be said that the alveolar accumulations are mere mechanical aggregations of units, and are, therefore, not growths within the range of our definition, and if not growths they cannot be tubercles. If this is true there is no occasion to make a special provision in our definition to exclude them. The distinction is, however, too refined and too hypothetical for practical purposes, and it would be unsafe to trust to it. If we say that tubercle is a growth which forms in a tissue which has descended from the serous layer of the embryo, this will exclude the alveolar accumulations, since they are of an epithelial character. But, according to the researches of Dr. Burdon Sanderson and others, the localities in which tubercle occur are characterised by the presence in health of lymphatic or adenoid tissue. If this opinion should be confirmed by future researches, it constitutes a real and important discovery, and will aid us very materially in giving a definite connotation to tubercle. I shall, in the mean-

time, accept Dr. Burdon Sanderson's views, merely remarking that, if they are not confirmed by subsequent observations, the definition must be modified accordingly. According to these views, then, tubercle is an *adenoid* growth. It is not meant by this that tubercle is a growth more or less similar to lymphatic or adenoid tissue, but that it grows in that tissue, and that, in the terminology of Virchow, it is not a *heteroplastic*, but a *hyperplastic* formation. This part of the definition, therefore, not only excludes the alveolar accumulations, but all other growths which do not occur in a locality which is characterised in health by the presence of adenoid tissue. But the most opposite kinds of growth may occur in adenoid tissue, such as pus, lymphomata, and cancer as a secondary formation. The definition must now be framed so as to exclude all these.

If tubercle is compared with cancer and other growths, such as tumours, which have high powers of self-maintenance, we find that the former is characterised by being composed of cells similar to lymph and white-blood cells, while the latter have cells which are very considerably differentiated from such elementary units. If we now say that tubercle consists of lymphoid cells, this will sufficiently distinguish it from those growths which have a distinct individuality, like cancer and from tumours generally. By *lymphoid cells* is simply meant that the units of which the growth is composed are more or less similar to lymph cells, and it involves no theory of their derivation. It is equally descriptive of tubercle whether its units are derived from proliferation of pre-existing cells, or from migration of white blood-corpuscles. It may also be added that *cells* are used here subject to the recent change in the theory of the nature of these elementary bodies, and that it is not meant that they are made up of cell-walls and contents. With this addition, the definition is, that *tubercle is an adenoid growth consisting of lymphoid cells.*

The definition, however, does not draw any distinction between tubercle and leucæmic growths and lymphomata. The most obvious differences between tubercle and these growths are that, in the former, the cells are more aggregated than in the latter; and that in tubercle the circulation is obstructed, while the other

growths are vascular. Which of these characteristics shall we select as a means of differentiation? Or is it necessary to include both differences in the definition of tubercle? If we say that tubercle is an adenoid growth consisting of closely-aggregated lymphoid cells this will undoubtedly serve, to a certain extent, as a distinguishing mark between tubercle, on the one hand, and leucæmic growths and lymphomata, on the other. It may, however, be asked how close must the aggregation be to constitute tubercle, and a difference in degree is too indeterminate to serve as a good characteristic in a definition, unless, indeed, we can give it a quantitative expression, which is impossible in this case. If we now turn to the other distinction, and say that tubercle is a non-vascular adenoid growth, this of itself will be amply sufficient to distinguish it from the other growths, and it will be perfectly superfluous to add that the cells of which it is composed are closely aggregated, since this is implied in its other characteristics. The only objection is that in its very early stage tubercle may not be absolutely non-vascular, but the vessels become obliterated so soon that non-vascularity is as good a characteristic as it is possible to obtain in order to distinguish between growths which in their early stages merge almost insensibly into one another. Our definition now is, that *tubercle is a non-vascular adenoid growth consisting of lymphoid cells.*

This definition is still very imperfect since it does not distinguish between tubercle and a circumscribed abscess occurring in adenoid tissue. What now is the most distinguishing characteristic between tubercle and pus? When pus occurs upon either the internal or external surface of the body it cannot be confounded with tubercle. The former can only be mistaken for the latter when it occurs in a locality characterised during health by the presence of adenoid tissue. But when pus does occur in such a locality both it and tubercle are non-vascular, both consist of lymphoid, and even of closely aggregated lymphoid cells, and it is possible for both to be similar to one another in outward form. How can they be distinguished in such circumstances? The most obvious distinction is that the cells of pus are moveable upon one another, while those of tubercle cannot be so moved

without destruction of the growth; the cells of the former are incoherent, and those of the latter coherent. Tubercle, therefore, as we now regard it, *is a non-vascular adenoid growth consisting of coherent lymphoid cells.*

There is one other characteristic which should not be left out of the definition of tubercle. One of the prominent features of the growth is that it is disseminated through the body. Whether the disease spreads through infection, or through the mechanical irritation caused by the absorption of small particles of decaying matter during the softening of the growth, is not yet determined. And although my own opinion is that the disease spreads, like pyæmia, by an infective process, it is necessary to avoid the inclusion of a theory of infection in our definition. The essential facts will be included if we say that the growth tends to become multiple, or, in short, that it is *generally multiple.* I say *generally* because it is possible for a growth to be tubercle, even when it is not multiple. The disease must have a starting point, and the first growth may be tubercle even before there is a second, although this is by no means always the case. The definition as thus amended is, that *tubercle is a non-vascular, generally multiple, adenoid growth, consisting of coherent lymphoid cells.*

But, although this definition serves to mark off tubercle more or less clearly from other growths, it is essentially defective. It fails to convey an adequate conception of all the growths which are usually called tubercular. This definition is descriptive of grey tubercle, and is only very partially applicable to the other forms of the growth. We must now endeavour to amend our formula so as to embrace, as far as possible, all the forms of tubercle. If we take a wide glance at the series of morphological changes undergone by organisms during the entire time of their individual existence, we shall find that they may be divided into three principal stages. The first is the stage of simple growth, which is usually accompanied by a process of differentiation; in the second stage, which represents the mature condition of the organism, the increase in size either ceases entirely or becomes very inconspicuous, while the changes which take place are repre-

sented mainly by processes of differentiation. The most marked feature of the last stage is a degenerative process, which is sometimes, but not always, accompanied by a decrease of size. These three stages—the *Aufbildung*, *Umbildung* and *Rückbildung* of Haeckel—may be traced not only in the life-history of physiological individuals (with very rare exceptions), but they may be equally noticed in that of the groups of individuals which constitute races, kinds and species, and in the parts of individuals which constitute organs and tissues, and even frequently in the life-history of the individual cells of which the tissues are composed; and these three stages can be more or less distinctly traced in the transformations of tubercle. The most marked feature of the first stage of tubercle is the rapid multiplication of cells which take place—a multiplication so rapid that the capillaries of the part are pressed upon and obliterated. The stage of growth is, then, very distinctly marked. The stage of differentiation is, however, very inconspicuous; and this is only what might be expected, considering the rapidity of the growth. Other things being equal, there is an inverse ratio between growth and differentiation. When an organism is highly differentiated the growth is slow, and *vice versâ*. There is no organism so highly differentiated as man, yet there is no organism which grows so slowly. But, although the stage of differentiation in tubercle is not well marked, yet there are slight indications that it is not entirely absent. The formation of the reticulum, in which the cellular elements of the growth become embedded, is, to some small extent, a process of differentiation. Even the absorption of the fluid of the growth which occurs at this stage is some evidence of a similar process, although there is some reason to believe that such absorption attends the incipient stage of degeneration. Processes of differentiation are, upon the whole, accompanied by consolidation of tissue, a rule which is well exemplified by the fact that the chrysalis during its transformation loses weight and bulk. The consolidation of the tubercle which occurs at this stage may, therefore, be taken as an indication of a process of differentiation. The change which tubercle undergoes at this stage has been called the fibroid degeneration; but, although I do

not deny that degenerative changes do take place at this stage I shall simply call it the fibroid change, a term which involves no theory of the process. But if the stage of differentiation is hardly discernible in the life-history of tubercle, the stage of degeneration is probably the most conspicuous and important of all. The fatty degeneration of tubercle, with its subsequent softening and ulceration, are so well known that I need not describe them here. I shall only remark that, other things being equal, the time occupied by the stage of degeneration bears a direct ratio to the time occupied by the stage of growth. The more rapid the growth the less conspicuous will be the stage of differentiation, and the more rapid will be the stage of degeneration. The longer the stage of growth the more marked will be the stage of differentiation, and the slower will the degenerative changes be in leading to the destruction of the growth. It is, therefore, apparent that the rate of progress of the primary stage of growth may lead to an almost endless diversity in the morphological appearances of tubercle.

These remarks show that the changes which tubercle undergoes are strictly analogous to the changes which take place in the life-history of organic individuals, of parts of individuals, and of groups of individuals; and this brings the morphological changes which occur in the life-history of tubercle within the scope of a very wide generalization. We might, therefore, content ourselves with summing up the results obtained in the briefest possible language, and adding them to our definition. But before we can give complete unity to our representation, we must not only know that changes do occur in tubercle in a certain order, but we must also know *why* they occur in this order, and *why* strictly analogous changes fail to be recognisable in allied growths. Before these questions can be satisfactorily answered we must regard tubercle not, as hitherto, in its statical, but in its dynamical relations,—not its morphology, but its physiology,—employing the latter term in the widest acceptation of the term. From the bare contemplation of the *product*, we must now pass to the consideration of the *process* which underlies its formation.

When a living tissue is irritated its cells begin to proliferate,

and it is now proved, that, under these circumstances, there is not only a multiplication of existing units, but also a migration of other units to the locality. Starting from these facts, without waiting to ask if an explanation of them is possible, we may notice the similarity of this process to what takes place in a certain district of a social organism under the stimulus of a sudden prospective increase of production. Not only do the individuals who already live in the district marry earlier and multiply more rapidly, but immigration takes place from other parts of the social organism. But whenever the units of a locality, whether of the individual or of the social organism, increase in number, no matter from what cause, it is evident that the required nutriment and the mode in which it is distributed and expended must undergo corresponding changes. If the regulative and distributive agencies undergo adaptive modifications corresponding to the increase in the number of the units which expend the nutriment, then the locality may become organised as an integral part of the whole. But if the structure of the part fails without being replaced by new structure, the molecular motion expended by the units cannot be balanced by an equivalent amount from absorbed nutriment, and consequently the units must either migrate or starve. The units may be said to *migrate* either when they disperse through the organism or when they become detached while living, no matter what may be their subsequent history; and they *starve* when the forces expended are not replaced by equivalent forces from absorbed nutriment, and it is needless to add that the latter condition when prolonged must be accompanied by a high rate of mortality. These remarks are as applicable to the units of which an individual is composed, as they are to the individuals which compose a social organism. Let us now confine our remarks to the *cell* or unit of which the individual organism is composed.

When a tissue is subjected to great irritation the subsequent multiplication of units is so great that the original structure of the part disappears, and the organised tissue is replaced by pus, a tissue which consists of freely moving units and destitute of structure. The implication is that the part has absorbed a large part of molecular motion, all of which is devoted to multiplication,

and none to that orderly arrangement of units into a coherent whole which constitutes organisation. What is the subsequent history of this tissue? When the pus forms upon a free surface its units become detached almost as soon as formed, and with this emigration from the parent organism ceases their interest for our present purpose. Again, when pus forms within the body it generally makes its way to the surface of the body by an extension of the process which first produced it, and by its units as it were feeding upon their more orderly neighbours. But no matter how the units make their way to the surface, they may be said when the abscess bursts to emigrate in a body, and their subsequent history does not concern us at present. But either some or all of these units may disperse through the organism. Passing over the condition of the surrounding textures which facilitates this dispersion, I shall briefly notice the kind of pus whose units become easily distributed. Along with the disintegrating process involved in the formation of pus there goes a corresponding absorption of molecular motion. When the irritation is excessive the disintegrating process will be rapid, and there will also be a correlative absorption of molecular motion. Under such circumstances a tissue forms which is fluid, with very incoherent units, showing a large amount of mobility; one in which the multiplication of units is rapid, and consequently their bulk diminished. It is scarcely necessary to add that this fluid tissue with small rapidly multiplying units may easily become dispersed throughout the organism. The laws of distribution of such tissues and the effects they produce upon the organism may be passed over at present. Their subsequent history belongs to pyæmia and septicæmia. It is obvious, however, that, when the units become detached or dispersed throughout the organism, the morphological stages of differentiation and degeneration cannot become developed in the locality primarily affected.

But the units of pus and allied tissues do not at all times either separate or dissipate. What becomes of them in that case? When pus forms in the tissues the growth is so rapid that the regulative and distributive nutrient agencies, the nerves and blood-vessels, disappear; and consequently if the units are not sufficiently

active to migrate, or to feed themselves by breaking down surrounding structure and thus making their way to the surface, their subsequent history may be summed up in one word—starvation. When pus forms within the body the proper tissues of the part become pushed aside; and as the units of the pus increase in number they become further removed from the nutrient juices, so that by-and-by whatever amount of molecular motion is expended by them is not replaced by the absorption of a corresponding amount from the surrounding medium. What, then, must be the morphological change which corresponds to this necessary molecular change? The first loss of molecular motion declares itself by the drying of the pus, which is accompanied by an approximation and shrinking of its units. This external change is in all probability accompanied, and in great measure caused, by a deeper chemical change. The proteinaceous substance which forms the protoplasm of the pus-corpuscle falls into a lower isomeric state,—a portion of water is thus set chemically free which is absorbed by the surrounding tissues. When the morphological changes in the life-history of tubercle was under consideration it was noticed that the consolidation of tissue which occurs was some evidence of a process of differentiation, but the drying of the pus can scarcely be regarded in this light. Everything points to the conclusion that the stage of growth gives place to that of degeneration without the intervention of a stage of differentiation. Subsequent to the drying of the pus loss of molecular motion declares itself by fatty degeneration. Without entering into the details of the chemical changes which accompany this transformation, the great point for us to notice is that the high molecular complexity of the proteine of the protoplasm is in great measure replaced by the lower molecular complexity of a hydrocarbon. If fatty degeneration proceeds rapidly before the pus has lost a large part of its fluid, the living units completely break up, and the product is converted into an oleo-albuminous fluid which Virchow calls "pathological milk," which is subsequently absorbed. If, on the other hand, the fatty transformation proceeds more slowly, while the pus has previously parted with a large part of its water, the units may retain more or less of their form, and this gives rise to what is called *caseous* pus.

If we carry these conceptions with us to the consideration of tubercle, we will not require to say much with regard to the mechanism of its transformations. We have just seen that in a circumscribed abscess the stage of the growth of the pus is succeeded directly by that of degeneration, while we have previously seen that in tubercle there is interposed between these a stage which, even if accompanied by some degenerative changes, is yet one mainly of differentiation. Why should a stage of differentiation appear in the life-history of tubercle, and not in that of pus, even when it forms in adenoid tissue? This depends upon the rapidity of the growth of the one, and the comparative slowness of the growth of the other. All the nutriment absorbed by the pus-corpuscles is devoted to their multiplication, hence the tissue breaks up into independent units; and the fact that the units of tubercle remain coherent shows that of the available nutriment a small margin is left which is not devoted to multiplication. And when the multiplication of the units of tubercle is checked by the pressure of the surrounding tissues and by the obliteration of the capillaries, the balance of nutriment which was not devoted to genesis is left to produce a slight process of differentiation. That the presence of the stage of differentiation depends upon the comparative slowness of the growth is further confirmed when we notice that this stage is the more conspicuous according as the growth of the tubercle is slow. So much is this the case that in the very slow growing tubercles the fibroid change which takes place is the most marked feature of their history. And even if we do not choose to extend the term tubercle to any growth in which the stage of fatty degeneration is absent, yet there are closely allied growths having a slow rate of progress in which the stage of degeneration either entirely fails or is not readily discernible. If the object of this paper were to discuss tubercle in all its relations, it would now be necessary to consider the various terminations of the growth; but, since the object is to arrive at a good definition, it is quite unnecessary to carry the discussion further. That tubercle ends in excavation, cretification or obsolescence, is a most important part of its clinical history; but the terminations of a growth have no right to be

included in its definition. A cavity, for instance, is neither tubercle nor an attribute of tubercle, and, therefore, has no legitimate claim to a place in its definition, and the same may be said with regard to the other terminations.

A consideration of the statics of tubercle has led us to the conclusion that the morphological changes of tubercle present three stages —one of growth, one of differentiation, and one of degeneration; and a consideration of its dynamics has confirmed and in great part explained this conclusion. The question we have now to determine is how best to include the transformations of tubercle in our previous formula. The formula was—that tubercle is *a non-vascular, generally multiple, adenoid growth, consisting of coherent lymphoid cells.* We have now to notice that this is only descriptive of tubercle in its first stage, and that it subsequently undergoes transformations, the first of which we may call the *fibroid change,* and, lastly, a fatty degeneration, which is generally called *caseation.* The definition, as amended by the addition of these elements, is—that *tubercle is a non-vascular, generally multiple, adenoid growth, consisting in its first stage of coherent lymphoid cells, and subsequently undergoing a fibroid change and caseation.*

In conclusion, I shall endeavour to remove one or two objections which may be advanced against this definition. Some may think that we ought to state in it that the growth is morbid; but a definition of a morbid tissue, in order to be adequate, ought to distinguish it from healthy as well as from other diseased tissues, and if our definition is not already adequate for this purpose it will not help us much to state that the growth is morbid. Imagine any one defining tubercle, with a view to distinguish it from cancer, by saying that it was a non-cancerous growth; and this is only a similar proceeding to that adopted by those who would distinguish between tubercle and healthy tissues by saying that the former is morbid, or, in other words, is not healthy. But the principal objection to this and to other definitions of tubercle is that it does not enable us to distinguish at all times between it and allied growths. But those who urge this objection seem to forget the nature of the facts with which we have to deal.

Objective differences never exactly correspond to subjective distinctions, and this is particularly the case in the present instance, since tubercle is surrounded on all sides by growths with which it is connected by transitional forms. Between tubercle on the one hand and scrofulous and leucocythæmic growths, lymphoma, pus, connective-tissue proliferations, epithelial accumulations in the alveoli, and fibroid on the other, there not only are, but there must be, intermediate forms in which it is impossible to determine whether a particular growth comes within the range of our definition or not. This difficulty, therefore, arises from the nature of the facts with which we have to deal, and no definition, however perfect, can ever entirely meet it. Similar difficulties of definition and classification are met with in all departments of biology. Botanists, for instance, meet with transitional forms which it is impossible to identify as belonging to a particular species, and if this be the case amongst organisms where the principle of natural selection has, to a large extent, produced extinction of the intermediate forms, how much more must it be the case amongst growths where no principle of the kind is in action.

GLEANINGS FROM OBSTETRIC CASES.

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On the treatment of hæmorrhage in abortion at the third month.

The hæmorrhage, in cases of abortion at so early a stage of pregnancy, is generally less formidable than that at a more advanced period, yet there are instances where the life of the mother is endangered from this cause. The various modes of treating this form of hæmorrhage produce very different results, therefore different stages require very different modes of treatment. For example, where there is every likelihood that the ovum will be preserved, the most judicious treatment is to apply a local styptic, such as perchloride of iron, and to administer a sedative to prevent further uterine contractions. If, however, judging from the large amount of hæmorrhage that has taken place and from the dilated condition of the maternal parts that the expulsion of the ovum is inevitable, and failing in the attempt to empty the uterus, it is the best practice to stuff the vagina with small pieces of sponge or to plug the cervix, in order to dilate the cervical fibres as well as control the hæmorrhage, and to administer ergot in order to encourage uterine contractions.

It is to the mode of treating the hæmorrhage in cases where the expulsion of the ovum is inevitable that I wish particularly to allude. If the hæmorrhage is severe, either plugging the vagina or the cervix may be had recourse to. The action of the vaginal as compared with the cervical plug, if I may be allowed to use the terms, is very much the same; the former dragging the os open after it has become saturated with blood and stiffened, the latter dilating the cervix direct. The material used to make the plugs

may be the same. I prefer one of Barnes's dilators for a cervical plug rather than a sponge, as it is less likely to be expelled on any exertion, because of its dumb-bell shape.

In two cases where I used the cervical plug I found it as effectual in controlling the hæmorrhage as plugging the vagina; it is more convenient, less troublesome, and much less disagreeable to remove, for all of which reasons it is not only more pleasant to the obstetrician, but must be also more favorable to the mother.

Disadvantages from the use of ergot.

I. *In causing or aggravating hour-glass contraction of the uterus.*—With some obstetricians it is a recognised practice in tedious cases of labour, where the pains are frequent and of short duration, and especially if there be any previous history of hæmorrhage, to administer a dose of ergot either shortly before or immediately after the birth of the child as a preventive of hæmorrhage. The effect of ergot is to produce uterine contraction, which, though equable, reduces the uterus to a more narrow compass where no resistance offers. If we consider the changes in the uterus at the termination of the second stage we generally find, that the pains which expel the body and lower extremities detach the placenta and dislodge it into the vagina; or it may remain in the cavity, to be expelled by further contractions. Often, however, the placenta is not detached so soon, here the ergotized uterus contracts around the placenta *in sitû*, the cervical zone contracting most narrowly, there being nothing to resist it. The seat of the so-called hour-glass contraction is immediately below the attachment of the placenta. This accounts for the rigid condition of the circular band, which is kept up by pulling at the cord.

I am convinced that a great number of cases of hour-glass contraction of the uterus are caused, and if not caused are greatly intensified, by giving ergot at this time.

II. *In primiparous cases.*—The only circumstance where the use of ergot in primiparous cases before the completion of the second

stage is justifiable is where the maternal passages are roomy and dilatable and the head resting on the perinæum. Although the head may rest on the perinæum and the pains be feeble in expulsive effort, ergot, by exciting to continuous uterine contractions, endangers the entirety of the uterus and perinæum, and also the life of the child.

The careful use of the forceps is much better practice.

III. A third disadvantage from the use of ergot occurred in a twin case after the birth of the first child, which was natural. The practitioner in attendance, finding the second child presenting by the head, and there being no pains present, administered a dose of ergot. The uterus contracted violently around the child, producing much pain, but no progress in the labour. I was asked to see the case, and on examination found the os firmly contracted. I advised a full dose of Battley's sedative, which relieved the pain and procured some hours of sleep. After five hours I saw the case again, when the os was dilatable, and, hæmorrhage supervening, I was induced to turn and deliver the child as soon as possible.

There is no doubt that ergot was the cause of the delay in the birth of the second child, yet ergot was indicated when a sufficient length of time had elapsed without pains having supervened.

Remarks on a case of hydatidiniform degeneration of the ovum.

The great danger to be feared in these instances is exhaustion from frequent and copious hæmorrhages. Such a case lately came under my care. The hæmorrhage had recurred frequently before I saw her, and so great was the exhaustion produced that the patient never rallied, although the hæmorrhage ceased after the removal of the hydatidiniform mass. Dr. Meigs regards this degeneration as depending upon "a hydropic state of the villi of the chorion, which by a process of endosmose under some maladive condition of the life-force of the ovum, is able to convert them into cysts, to the ruin of the product of the fecundation."

Where such a state of things exists it is of the utmost importance that the diagnosis should be made early. In the case I

mention there was no difficulty, because of the dilated condition of the os uteri, from the rapid increase in size of the abdomen compared to the previous pregnancy, and from the presence of watery vesicles in the discharges and upon the finger after examination.

A correct diagnosis having been made, it is in the mother's favour that the uterus be emptied of its contents as soon as possible. If the os is not dilatable it should be artificially dilated, so as to allow the hand to be introduced in order to scoop out the hydatidiniform mass. Without doing this we cannot be certain that the whole is removed, as the mass may be adherent to so large a uterine surface, and if not wholly removed the hæmorrhage is likely to persist. When the whole mass has been removed and yet the hæmorrhage does not cease, the uterus must be swabbed out with perchloride of iron. The use of ergot is also an adjuvant in keeping up uterine contraction.

DETACHED NOTES ON SOME SYPHILITIC AFFECTIONS OF THE EYE.

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A few brief notes illustrating some of the effects of syphilis upon the nervous structures of the eyeball may not be without interest.

The first to claim attention are inflammatory changes occurring in the optic nerve or retina (separately or together) during the "secondary" period of syphilis; they correspond with or closely follow the papular or squamous eruptions, the early iritis, &c., and may be looked for, as a rule, in the first eighteen months after infection.

The condition of the system in this stage is marked by a modification (more or less profound, according to circumstances) of the whole nutrition. This has hitherto been most easily seen and most closely studied in the skin. Briefly, it may be described as culminating in limited patches of plastic "inflammation," indolent and tending very slowly towards resolution, suppurating only in cases of a pre-existent pyogenic habit, but in subjects of an average standard maintaining its character of a deposit, capable of cure by degeneration and absorption, without necessarily inflicting destruction upon the normal elements of the tissue in which it has occurred. That this particular change takes place by preference in certain localities is undoubted, but we must bear in mind that there is no reason to suppose that the tissues of other parts of the body are incapable of undergoing the same modified growth, albeit they seem to be, as a rule, exempt. Increased carefulness and improved means of observation will show us the area of action much enlarged. Already in a few years the ophthalmoscope has enabled

us to *see* in the retina and optic nerve changes that were not even guessed at, and to deduce intra-cranial mischief with a very considerable amount of certainty.

It is with these changes we are now especially concerned. The starting-point may be a chronic inflammation of the meninges contiguous to any part of the nerve-trunk, or in the connective tissue of the nerve itself, in either case passing down in continuous proliferation to the retina, constituting a species of neuritis descendens, or, on the other hand, commencing in the connective elements of the retina and thence spreading upwards towards the brain, constituting a neuritis ascendens. In the majority of cases seen the upward or downward route is but incompletely travelled, many cases of neuritis stopping short at the disc, and cases of retinitis failing to involve the trunk. The pathological process, whether limited or extended, is identical; the symptoms offer some variety.

Retinitis in syphilis is, I think, tolerably frequent. I have in a few cases satisfied myself of its existence during early iritis, when, of course, without a special examination it would be masked by the more superficial disease. Any accurate observation of the deeper tunics during the active progress of iritis is so obviously difficult that it is scarcely possible to form any opinion of the frequency of the coincidence. In some cases I believe retinitis escapes observation altogether. I have in more than one case detected it before the patient's attention had been directed to the eyes by any marked symptoms.*

In those cases free from iritic, choroidal, or hæmorrhagic complications central vision is often so little impaired that the patient can read No. 3 or 3½ Snellen with no difficulty, and consequently

* Syphilitic patients may be divided into two classes—(α) Those who, from a natural buoyancy of disposition, or from a belief that the initial lesion, the corona veneris, or the loss of a nose, are the main effects of "the venereal," are consequently careless of less prominent symptoms, looking upon the sore throat as a cold, iritic neuralgia as tic, and ascribing even amblyopia to the ill-effects of wind or gas light, and who consequently have to be frequently reminded of the necessity for care. (β) Those who are morbidly affected, who examine every falling hair with anxiety and every pimple with alarm, whose lives for months (or it may be for years) are spent in a terrified bogy-hunt, and who only too frequently suffer in body and pocket from the physic and rapacity of the quack.

is not embarrassed by ordinary sized print. As the disease progresses the acuteness of vision slowly but surely diminishes, till at length, with but comparatively little turbidity of the media, No. 20 is painfully read at a few inches from the eye. From the beginning, however, the periphery of the visual field is remarkably contracted, and this condition is most persistent during the whole course of the disease. In some cases patients, without understanding the cause, complain that they jostle passers-by and cannot cross the street with safety.

Photophobia is seldom present in any marked degree, but exposure to a bright light gives rise to a dull deep-seated pain. Flashes of fire and globes of green or of red light are of common occurrence. Inability to see in the dusk obtains throughout the course of the disease, and remains a troublesome symptom for some time after active mischief has disappeared. Vision for colour is in some cases not affected, in others very remarkably. To this symptom I hope to refer at a future period in some detail, noting at present that the two secondary tints, green and purple, are in the majority of cases the stumbling-block; the former being undistinguishable from its primaries (more especially blue), the latter altogether losing its identity and appearing dark brown or black. This approaches in character the effect of a yellow light, such as the sodium flame upon a healthy retina.

The changes visible by the ophthalmoscope are, in the beginning, increased vascularity and a gradual substitution of an irregular foggy grey tint for the normal retinal transparency; it is as if the choroid were covered with a thin layer of milk-arrowroot. The effusion, probably at this stage serous, is irregular in its distribution, and is generally seen in the neighbourhood of large veins, or invading the macula, or surrounding the edge of the disc, which appears blurred and indistinct, although its proper surface may yet be focussed clearly. A peculiar dotted appearance, like the stippling in miniature flesh-painting, is often to be observed in portions of the fundus. As the disease progresses small nodules of lymph are thrown out. They are almost invariably on the course of the large veins whose circulation they not unfrequently impede. They are irregular in shape, raised, with woolly edges, surface white, strongly

reflecting light, and sometimes bounded by a deposit of pigment. They are frequently mistaken for atrophic patches, but may be distinguished by observing that the veins in relation are enlarged rather than diminished, or may be traced passing beneath the deposit or thrust on one side by its protuberance. It is somewhat more difficult to diagnose them from the patches of albuminuric retinitis. These are generally more brilliant, but inclining rather towards yellow than pure white in tint, larger, more symmetrical, accompanied by numerous hæmorrhages. This last characteristic is, in my experience, very rare in syphilitic retinitis. In one of Leibreich's drawings a large hæmorrhage is figured, but it is described as unusual. Fig. 1 represents the condition I have attempted to describe. The drawing was taken from the left eye of a patient in whom other secondary symptoms had nearly disappeared. The right eye was very slightly affected. The fundus was somewhat pale, veins much enlarged and tortuous, edge of the disc slightly blurred at the apparent inner and upper third, the lower third occupied by two prominent patches of effusion, in one case surrounding, in the other pushing aside, the large vessels in immediate contact. There were no hæmorrhages, no depositions of pigment, nor did the optic nerve become affected.

The outline of a case in which the inflammatory process began in the intra-cranial portion of the tract and travelled downwards to the retina will exemplify the leading features of the descending variety. A young man contracted a chancre in July, 1872. This seems to have healed readily under treatment. He applied to me in the course of the September following with some psoriasis palmaris, papular and pigmented eruption over the body, sores in the fauces, mucous tubercles on the tongue and angles of the lips, cervical and inguinal adenopathies well marked. His general health, appetite and strength good. Under treatment he soon began to improve and ceased to visit me, though I warned him of the advisability of keeping under supervision for a time.

After some months he reappeared, suffering much annoyance from the state of his tongue and mouth. He complained of vertigo and pain after using his eyes. With the ophthalmoscope the disc of the right eye was found to be tumid, of a violet or

FIG 1.

FIG. 2.

E A. B. AD NAT. LELT.

purplish-grey colour, contrasting very imperfectly with the choroidal reflex under the strong light of the indirect examination, the veins large and tortuous, the arteries small but plainly distinguishable. The left disc was at this period very slightly affected, and the retina in both eyes unattacked. Notwithstanding my urgent warnings he absented himself from observation for more than a month, pursuing his medicinal treatment with some regularity, but absolutely neglecting to take care of his eyes. This course seemed to account for an improvement in the cerebral symptoms, but a marked deterioration in the condition of the eyes. I noted at the time, in the right eye, optic-disc red except porus opticus, edge just distinguishable from retina, reflexion hypermetropic, rest of fundus emmetropic (indicating considerable bulging), radiating vessels plainly visible and numerous, arteria centralis visible with a white outline, veins much dilated and tortuous, retina muddy, towards periphery one or two disseminate patches of pigment. Left eye optic-disc irregular, red, radiating appearance of fibres, vessels numerous but clouded, veins dilated and tortuous but not so kinked as in right eye, disc seen erect at distance but not so clearly as right, retina cloudy opaque. Subsequently deposits of lymph took place on the course of large veins in both eyes, central vision deteriorated somewhat, peripheral much contracted, almost absolutely blind in the dusk, confused blue with green, distinguished yellow plainly, pink and vermilion not very distinct, mauve nearly black, "very different from blue." Fig. 2 is from a careful sketch made shortly after the inflammatory process, having reached this limit, had begun sensibly to abate. The points illustrated by this case are the proneness of inflammatory action in nerve structure to spread by conduction from a focus once set up; the possibility of a severe retinitis existing for some time without involving other tissues (for at no period could I detect choroidal or iritic complication); the possible immunity of the macula from serious injury during a period of months (shown, I think, by the condition of central vision as well as by absence of ophthalmoscopic signs), and the ill-effects of neglecting local hygienic precautions, functional rest, &c., even when the mischief is from a general cause.

During the tertiary period mischief may arise in the manner

illustrated by the following case. A married woman, very thoroughly syphilized (but at what date I did not inquire for fear of raising connubial difficulties), suffering with a severe destructive ulceration of the left palate, tongue and larynx, and ozæna, all of a well-marked tertiary type, first came under observation with a lachrymal abscess caused by a partial necrosis of one nasal bone. As she complained of headache and some dimness of sight in the right eye, it was examined and the optic disc found to be irregular, much swollen, woolly, vessels large but blurred, the retina unaffected. The left eye normal. Now, although these symptoms correspond closely with those of optic neuritis as above described, the pathology is different. The condition is that known as the Stauungs-papilla, ischæmia papillaris, or choked disc. It is primarily due to arrest of the venous circulation, by either intracranial or orbital pressure. As there was no protrusion of the eyeball nor evidence of orbital mischief, it seemed not improbable that the cause was to be sought for in a localized meningeal affection, giving rise, perhaps, to a kind of node within the skull. The supposition was supported by the rapid relief afforded by full doses of iodide of potassium. It must be remembered in a case of this nature that the inflammatory process in the disc is entirely secondary to the original state of congestion produced by pressure at a distance, and is not in itself due to the syphilitic action. The congestion may be followed by a true local inflammation, which may spread by continuity to the retina or upwards along the optic nerve. By exactly the same mechanism at a later stage in the disease intra-cranial gummata may give rise to the same series of changes within the eyeball. In all these cases increase of connective tissue or atrophy of nerve substance, causing (in proportion to their extent) loss of function, must be looked upon as imminent. Many cases, it is true, recover with little or no damage, but such favorable results must not be expected in some instances unless a correct diagnosis is followed by a vigorous treatment, directed, not to the symptoms, but to the cause. From what I have said it will be perceived this is not always the same.

ON THE CONSTRICTOR ACTION OF THE INTERCOSTAL MUSCLES.

By ARTHUR RANSOME, M.D., M.A.,
LATE EXAMINER IN ANATOMY AND PHYSIOLOGY AND PHARMACOLOGY TO CAMBRIDGE UNIVERSITY (1868—1869).

Amongst the various actions which have been attributed by different observers to the two layers of intercostal muscular fibres, no note appears to have been taken of a function which may, I think, be fairly assigned to them, namely, the indrawing or constriction of the walls of the thorax. It is probable that the supposed rigidity of the bony levers—the ribs—has in some measure prevented the recognition of this action; and the fact that constriction of the chest-wall takes place only during forced breathing, would prevent it from being remarked in experiments upon the ordinary respiration of animals.

In Traube's remarkable series of vivisections ('Gesammelte Beiträge zur Pathologie und Physiologie') there are, indeed, indications that in the difficult breathing produced in rabbits by section of the inferior laryngeal nerve the lower ribs are drawn inwards, probably by the action of the diaphragm, and the same influence is to be remarked in the cases given by Mr. Le Gros Clark in the 'Proceedings of the Royal Society,' vol. xx, p. 125.

I have, moreover, myself brought forward evidence, both from actual experiment and from stethometric measurements, which proves that the upper ribs, as well as the lower, are usually pliable to a considerable extent in living subjects;* and the fact that in forced breathing in man, a distinct change takes place in the chord lengths of the ribs may readily be demonstrated by means of measurements with suitable callipers.†

It is important that the fact of this bending of the ribs should

* 'Proceedings of the Royal Society,' No. 139, 1872.

† Also the subject of a communication to the Royal Society, but not yet published in the 'Proceedings.'

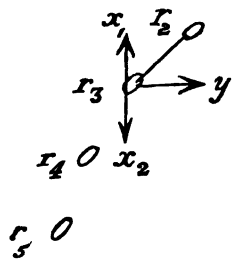
be fully recognised before an attempt is made to explain by what forces it is produced, and the discussion of the difficult question of its causation should not be allowed to prejudice the observations upon which it rests. That the ribs do bend in forced breathing may be seen by any one who will use the suitable instruments; how they are bent is much more difficult to prove. It is, however, necessary that the subject should be fully considered, and I venture to adduce the following reasons for assigning to the intercostal fibres a large share in the work.

Since the change in the curvature of the ribs takes place, not only in the lower portions of the thorax to which the diaphragm and abdominal muscles are attached, but also as high as the third or even the second pair of ribs, it is evident that it must be effected by some of the intrinsic thoracic muscles.

But it is probable that no muscles are so advantageously placed for performing this duty as the intercostal fibres. When the first ribs are fixed by the cervical muscles, and the lower ribs are drawn downwards and even inwards by the abdominal group, then any fibres between the other ribs acting in concert, whatever their direction, will necessarily draw inwards the intervening bony hoops.

The shape of the thorax is such that, if the ribs below the first are capable of being bent, they must be drawn inwards by the contraction of muscles placed between them.

FIG. 1.



From the first to the seventh the rib circuits descend in widening diameters, and the planes of the intercostal spaces, instead of being vertical, are more or less inclined. The force exercised by the muscles in these spaces may therefore be resolved in a vertical and a horizontal plane, and the amount of power drawing inwards along the latter plane will, *cæteris paribus*, depend upon the obliquity of the intercostal plane, and will be greatest in the upper part of the thorax. The tendency throughout, wherever there is any slope at all, will, however, be inwards.

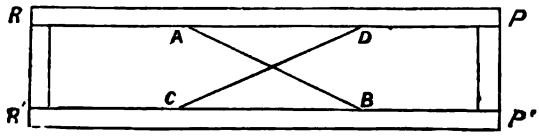
Let r_2, r_3, r_4, r_5 (fig. 1), represent transverse sections of the 2nd,

3rd, 4th, and 5th ribs respectively, then any force acting between two ribs, r_2 and r_3, in the direction of the intercostal space, r_2, r_3, may be represented by the lines drawn in the directions x and y, at right angles to one another, and the lengths of these lines will depend upon the obliquity r_2, r_3.

Moreover, the oblique direction of the fibres of the intercostal muscles adapts them still more especially for a constrictor action.

When two elastic bands (A B and C D) are stretched crosswise between two bars (RP and R′P′) capable of being bent laterally, but not from above downwards, and which can only be approximated

FIG. 2.



to a limited extent, then, when this approximation has been produced, the tendency of the further action of the bands is to draw together the ends of each bar. In the language of mechanics, the forces they exert may be resolved in the directions RR′ and RP, or R′P′ and *vice versâ*. If the bars are quite straight, no moving effect will follow, since the bars cannot then yield to the forces acting along RP or R′P′, but they will be in a position of unstable equilibrium, such that the slightest curvature in the bars will at once permit the bands to contract, and a further bending will take place in the direction of the curvature so introduced.

Now, this latter case is precisely that of the ribs when acted upon by both external and internal fibres at one time, and since the rib-levers are free to move at their anterior extremities, and are more pliable and thinner at these points, it follows that the chief bending action will take place in the anterior wall of the chest, and a general indrawing of this part of the thorax will be the result. The effect of each fibre, or of each pair of fibres, is necessarily very small, but the aggregate power they can exert is probably quite sufficient for the purpose.

It is interesting to notice that in other parts of the body, wherever constriction of a cavity is required, there we find an

oblique arrangement of muscular fibres generally in two layers running in opposite directions. In the abdomen, the external and internal oblique muscles, in the pharynx, the middle constrictor spreading fan-like, with its outer fibres directed across those of the upper and lower muscles. In the bladder and stomach the same arrangement is to be observed, and even in the heart, although the muscles are spiral in their arrangement, their fibres are so placed that they run in a similarly opposed fashion.

Viewed in this light, the intercostals may perhaps be regarded as two large muscles, having, like the rectus abdominis, ligamentous or bony portions placed at intervals in their course, modifying and in some ways increasing their power, but not altogether preventing them from exerting a combined influence, and so constricting the cavity of the chest.

This account of the *united* action of the intercostal muscles, working in concert with the external muscles of expiration, does not clash with the received doctrines respecting the inspiratory functions of the external intercostal, and inter-cartilaginous muscles acting independently, or together with the cervical and levator muscles of the ribs. The experiments of Traube on rabbits seem to be absolutely conclusive on this point. ('Experimentelle Untersuchungen,' p. 158.)

Again, the rib-depressing power of the internal intercostal muscles acting alone would still be possible, and they might also combine with the abdominal muscles to draw down the ribs after they had been raised by the levatores costarum and the other inspiratory muscles.

It is highly probable also that in the upper regions of the thorax the triangularis sterni assists in the process of constriction, and that the diaphragm and abdominal muscles produce some portion of the inbending of the ribs below the sixth.*

* On these points I would refer to Mr. Le Gros Clark's "Remarks on the Mechanical Respiration," 'Proceedings of the Royal Society,' vol. xx, p. 123; to a paper "On the Action of the Intercostal Muscles," by Dr. Dwight, jun., in the 'Boston Medical and Surgical Journal;' to the first of Professor Humphry's Lectures on "Human Myology," delivered before the College of Surgeons, and to some remarks of my own "On the Action of the Intercostal Muscles," in the 'Brit. Med. Journal' for October 26, 1872.

The question of the indrawing and constriction of the chest-wall during forced expiration is not without much practical importance, since it bears closely upon the pathology of emphysema, and its production by asthma and chronic bronchitis.

In making stethometric observations upon persons suffering from bronchitis or phthisis, I have often noticed that whilst the patient has been making forced efforts at breathing, cough has come on, and the ribs have been immediately drawn inwards to a far greater extent than had been accomplished voluntarily, showing that the reflex stimulation of the muscles of expiration, by irritation of the bronchial mucous membrane, was able to accomplish far more than the power of the will.

Now, if in forced expiration, as in coughing, the lung should be compressed by the direct force of the indrawn ribs, then in the natural condition, this pressure will take place at the most favorable moment, when the lung is already partially emptied of air, and when the squeezing effect will be comparatively harmless; but if there is any obstruction to the free exit of air, as in bronchitis or asthma, then the lung will be caught in the position of partial inspiration, and, so to speak, will be taken at a disadvantage, with all its cells distended with air, and ready to be forced into any inequalities in the compressing walls. Here, then, we have an intensification of all the influences which have been considered as the expiratory causes of emphysema.

The subject is not without interest also in relation to the peculiarities in the movements of the chest-wall in pleurisy, emphysema, chronic bronchitis, and phthisis; but on these points I must refer to a paper on "The Respiratory Movements in Man," published in the last volume of the 'Transactions of the Medico-Chirurgical Society.'

NOTES ON A CASE

OF

ABSCESS OF GALL-BLADDER

WITH

DISCHARGE OF GALL-STONES THROUGH THE ABDOMINAL PARIETES.

By J. EDWIN SCOWCROFT.

Though this case is not without precedent, it is of infrequent occurrence and of interest as occurring in the male sex.

There are, I believe, about seventy such cases recorded which, with few exceptions, have occurred in females of middle or advanced age.

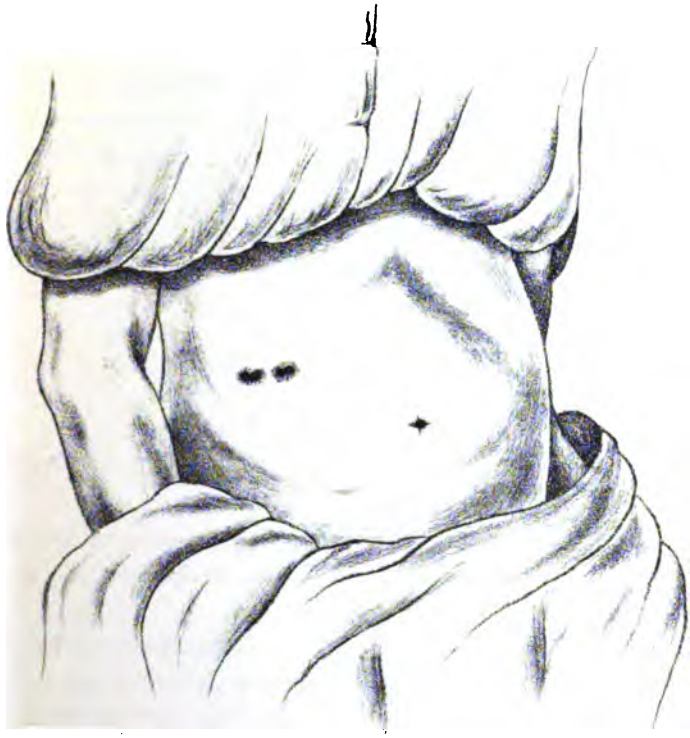
J. K—, æt. 50 years, a railway contractor, was attacked in April, 1871, with persistent pain in the region of the liver which gradually became worse, being attended with fever and other symptoms of constitutional disturbance. He had frequent attacks of vomiting; but there was no jaundice.

The pain and vomiting continued for about four months, at the end of which time an enlargement was noticed in the right hypochondriac region.

The swelling gradually increased in size for three months, when it burst and discharged a large quantity of matter mixed with a little bile.

The pain still continued almost as severe as before, and, indeed, in about three weeks from this time somewhat increased.

Being disturbed one night by one of his children crying in bed, he went to it, and, whilst in the act of "covering it up," a small biliary calculus escaped from the aperture which the ulcers had



Calculi natural size

left—a second was discharged a week afterwards, and from this time until the 12th of May, 1872, two stones were passed each month. Many have passed since that time, the last one coming away in August of this year; the patient each time suffering a little pain for a few days previous to the escape of the calculi, but not so severe as to prevent him following his employment.

The man has indeed during the last six months been gradually gaining flesh, and both looks and is well.

The total number of calculi is fifty-three. Each calculus presents several facets.

The position of the fistula and size of the calculi are shown in the drawings.

TWO CASES OF EXCISION OF THE SCAPULA.

WITH REMARKS ON THE BEST MODE OF PERFORMING THE OPERATION SO AS TO AVOID HÆMORRHAGE.

By Dr. KELBURNE KING, F.R.C.S.,
SURGEON TO THE HULL INFIRMARY.

During the summer of 1869, Henry R—, æt. 26, a native of Grimsby, applied at the Hull Infirmary for advice regarding a tumour of the right shoulder. He had noticed it for some months, but it had not caused him any uneasiness till shortly before, when the pressure of the clothes on the part produced pain and led him to seek relief.

On examination there was felt above the spine of the scapula a round, perfectly hard and solid tumour about the size of an orange; not painful to touch or handle; not moveable, but firmly attached to the fossa supraspinata from which it sprung. The base felt broad, but at first it had very much the feeling of a round exostosis. Gradually, however, it extended across the spine and into the infraspinous fossa over the middle portion of which it rather rapidly extended. The use of the arm was now much limited. The pain was constant and interfered with sleep, though still it was not very severe; but his general health was suffering, and he was desirous that anything likely to relieve him should be done.

He was admitted an in-patient on October 11th. The whole dorsal aspect of the scapula was now occupied by the hard, firm, bone-like tumour, and, under the impression that it was a non-malignant tumour of the bone, I determined to excise the whole of the scapula external to the glenoid cavity, which seemed quite free from disease.

On the 20th October the following operation was performed :— An incision was made along the spine of the scapula from the base of the acromion process to the vertebral margin. The origin of the trapezius was then detached and the fingers were passed round the great bulk of the tumour in the supraspinous fossa. Owing to its size this part of the bone was easily pulled forward, and the supraspinal artery divided and easily ligatured without any loss of blood. Then placing the forefinger of my left hand on the axillary border of the scapula just behind the triceps muscle, where I could feel the pulsation of the dorsal artery, I entered the knife at the acromial end of the first incision and cut downwards to my left forefinger and about two inches past it along the axillary margin of the scapula; still pressing my finger on the dorsal branch I cut through the deltoid and so exposed the scapular muscles, the long head of the triceps, and the scapular vessels and nerves. These last were quite out of the way, and, still feeling the dorsal branch with my finger, I passed a needle set on a handle, and armed with a ligature, round the vessels and adjacent cellular tissue, and tied a firm knot. There had been copious bleeding from many vessels when I removed my finger from the dorsal branch; but the moment that the ligature was tied this ceased, and the subsequent steps of the operation were almost bloodless. The base of the acromion was divided by bone forceps, and the neck of the glenoid cavity cut through with the saw. The tumour was then lifted up and separated from its attachments by cutting from without inwards. Three branches of the posterior scapular artery required ligature. The whole surface was washed with a weak solution of carbolic acid and the wound dressed with carbolic oil.

The subsequent history is shortly told. The wound was very soon converted into a superficial ulcer, and the ligatures came away without any hæmorrhage; but there was considerable tendency to falling down of the lower edge of the wound, and the man's health did not rally as might have been expected.

On December 6th he was advised to go home, for the sake of better and purer air. I heard afterwards that the wound healed up, and that for a short time he appeared to improve; but

tubercular disease took place afterwards in the lungs, to which he ultimately succumbed. The tumour, as I supposed, was of a benign, osseous character.

The next case is that of C. A. M—, æt. 8, who was brought to the Hull Infirmary as an out-patient in April, 1871, under the care of my colleague, Dr. Elliott, on account of headache, loss of appetite and general debility. Finding that internal remedies produced no effect, Dr. Elliott carefully examined the child and observed a swelling over the region of the right scapula. This was said to have been caused by her having been knocked violently against a lamp-post eight months before, but it had not excited the particular attention of her parents, as it was not and had not been the seat of pain. The child was transferred to my care, and was admitted an in-patient of the Infirmary on May 24th, 1871. The tumour then caused a perceptible swelling over the whole scapular region most distinct above the spine, where it formed a considerable projection which on strong pressure yielded with a kind of crackling sensation. To satisfy any doubt an incision was made into this part of the tumour, when the finger seemed to pass into a bag of fragments of bone and soft curdy matter. A portion of the latter placed under the microscope was found to consist of large cells, containing many and large nuclei evidently of a malignant nature. The child's condition getting rapidly worse, excision of the entire scapula was recommended and agreed to by the parents. On the 17th June the following operation was performed:—An incision, as in the former case, was made along the whole length of the spine and acromion process, the scapular origin of the trapezius was divided, and the ligaments connecting the acromion and clavicle. The upper margin of the scapula was then drawn outwards, and the suprascapular artery divided and tied —all without the loss of two teaspoonfuls of blood. An incision was then made through the integument, from the middle of the lower lip of the first incision to the axillary margin, and the integument reflected; the origin of the deltoid was then divided, so as to expose the scapular muscles and long head of the triceps. A few scratches at the vertebral side of this muscle brought into view the dorsal vessels, and the armed needle was passed around them as

in the former case. Not a single vessel had spouted, and, feeling that there was no possibility now of any hæmorrhage of consequence, I opened the joint, got hold of the coracoid process and lifted up the scapula from its attachments, taking care to cut wide of the tumour and remove the bulk of the serratus magnus. Finding that the smallness of the opening in the skin impeded me, I made another incision from the spinal end of the first one along the vertebral edge of the scapula, and finished the operation by cutting through the muscular attachments of this border.

I pointed out to my colleagues and other medical friends who were present that not two tablespoonfuls of blood had been lost throughout the whole operation; indeed, no more than is common in an excision of the elbow or other ordinary operations of surgery.

Similar treatment was applied to the wound as in the case of R—, except that carbolic lotion only (not the oil) was used. The girl never had a bad symptom; the wound became from the time of the first dressing a superficial one; the ligatures (three in number) came away without any hæmorrhage. And on July 1st I find it noted in the hospital book that her health was improved, the appetite good, and the wound healing.

On August 11th she became an out-patient, having excellent power over the forearm and hand, being able to knit and feed herself and being fat and in the enjoyment of good general health. The wound was prevented from healing up entirely, by the projection of the clavicle, and I would have felt inclined in a similar case to have removed the outer portion of that bone.

In this operation hæmorrhage seems to me to be the only difficulty to be dreaded. Skey, speaking of a case in which he operated, says, "Had I undertaken the operation without ample assistance I have no doubt the man would have died on the table, so large was the bleeding from the vessels on each aspect of the bone." Syme says, that "wishing to command the subscapular artery I divided it, with the effect of giving issue to a fearful gush of blood, but fortunately caught the vessel and tied it without any delay."

Since the first of these two operations was performed Sir W.

Fergusson, in the last edition of his 'System of Practical Surgery,' strongly recommends "freeing and isolating the posterior and other margins before disarticulating, as much blood will thereby be saved." Lastly, in an article on "Excision of Bones and Joints," in his 'System of Surgery,' Mr. T. Holmes recommends that after the incisions through the integuments "the muscles inserted into the vertebral border of the bone should be rapidly divided, as also those which are attached to the spine of the scapula."—"The subscapular artery is divided near the end of the operation," and, he adds, that "in this way he has seen the scapula removed, with a very large and vascular tumour, without any serious bleeding."

Still, as the source of hæmorrhage must be the subscapular artery, I think the most reasonable course is to plan the operation so as remove this source of danger at the outset—neither to trust to able assistants, like Mr. Skey; to fortunately securing the vessel after a fearful gush, like Mr. Syme; nor to rapid strokes of the knife beginning at the remotest part—the vertebral border; but to begin by putting all risk of danger out of the question by securing the vessel at the internal border of the scapular head of triceps. This once done, there is no need for unusual assistance nor for haste. And these two cases show that the vessel can be readily secured at an early stage of the operation, and that once secured all danger from hæmorrhage is obviated.

I have seen this girl frequently since the wound healed, and have been surprised to notice what an excellent joint has been formed between the head of the humerus and the end of the clavicle. This result, I believe, more than counterbalances the trouble which the projection of the bone occasioned during the process of healing, and fully justifies the retention of the scapular end of the clavicle.

The accompanying plate, from a photograph taken two years after the operation, shows the articulation which has formed between the clavicle and the head of the humerus.

REMARKS ON FACIAL CARBUNCLE,

ESPECIALLY WHEN AFFECTING THE LIPS.

By CHAUNCY PUZEY,
SURGEON TO THE LIVERPOOL ROYAL INFIRMARY LOCK HOSPITAL.

Although it is traditional that the prognosis of carbuncle occurring about the head and neck is unfavorable, I find that comparatively little has been written (by English writers at least) on the subject of facial carbuncle or furuncle, a form of disease which seems to have been freely discussed in France (where by many it has been confounded with malignant pustule), but of which I find but few cases recorded by English surgeons.

I have therefore thought that some remarks on the principal features of this affection, its peculiar fatality, its diagnosis and treatment would probably be of interest to many.

I cannot lay claim to any original observations; for my paper is based upon information gleaned from medical publications, and from inquiries I made in consequence of having met with the following case:

On the 6th February this year I saw, with Mr. Warburton, of Edge Hill, Liverpool, a girl eight years of age, of whose illness I received the following account:

She had been in good health until a few days previously. On the night of January 31st she was restless, and complained of soreness and itching about the lower lip; the next day she was fretful and kept picking the lip, on which her mother noticed a small irritable spot which she supposed was the result of a scratch. Next day (2nd February) the lip became more inflamed and slightly swollen; and the child became feverish and ill. On the 5th Mr. Warburton was called in, and on the 6th I saw her.

Her condition was as follows:—Her lower lip was much swollen, dusky and everted, and near the left angle of the mouth pre-

sented a blackish and fissured patch about the size of a three-penny piece. The blackness appeared superficial, but the whole thickness of the lip was swollen and hard; and this induration extended over the chin; some distance over both cheeks, especially the left; below the jaw; and over a great part of the left submaxillary region. The skin was in some parts bright-red, and in others dusky-red, and shining. No fluctuation was felt in any part. The mouth could be opened sufficiently to allow of protrusion of the tongue, which was furred, but moist. There was no difficulty in swallowing. The pulse was 140; the temperature was not taken. The child lay in bed, and complained loudly, when moved, of pains in the knee and ankle-joints, which, however, did not present any appearance of inflammation. She suffered much from want of sleep.

I felt uncertain about the nature of the case; but it appeared to me that, although the mischief had arisen in the lip, it had now extended so far that nothing could be gained by incising the lip.

Poultices were ordered for the face; poppy fomentation for the joints; a calomel purge, and afterwards a mixture of chlorate of potash, hydrochloric acid and bark; small quantities of wine and beef-tea at frequent intervals, and hydrate of chloral at night; the mouth and lip to be frequently syringed with warm water. The next day matters appeared in *statu quo;* but on the 8th, the redness and induration had extended further up both cheeks, and over to the right submaxillary region; both eyes were closed, and here and there over the chin and cheeks were a few small pustules. The chin felt cold and looked mottled, the veins appearing as purple streaks. Pain in the left chest was also complained of, but no abnormal sounds were detected. The child had been very restless throughout the night, and her pulse was still 140.

It appeared imperative to relieve tension, and as there was no fluctuation perceptible in any part, and as the patient was a female whom I did not wish to disfigure, I made a free incision in the median line, in the submental region (whilst Mr. Warburton gave chloroform), taking time about it, and cutting until I felt that I had penetrated the hardened tissues.

There was not any troublesome hæmorrhage; the textures were brawny and almost like gristle. No pus was let out, but here and there, at the sides of the wound, little dots resembling pus could be distinguished. The poultices were re-applied. Next day the chin was warmer and less mottled; submaxillary region softer; eyelids less swollen. The poultice was merely stained with pus.

On the 10th, the child was evidently better; redness and induration much less; lip cleaner; left cheek more swollen, but softer; the pulse still continued over 130; appetite good; merely a trace of pus in the wound.

On the 13th, a scab had separated from the lip; an abscess was evidently forming in the left cheek. In the evening of this day, the child had an alarming attack of faintness: brandy was ordered in frequent doses, and ammonia, instead of chlorate of potash.

Next day (14th) the cheek was punctured and a large quantity of pus let out. On the 15th the pulse was much slower, and on the 16th below 100.

The swelling of the face was now rapidly disappearing, the lip nearly healed; but the child was excessively weak and emaciated, complaining of occasional pain in the chest, and in the knees, when moved.

A fortnight after, I saw her again, in consequence of her complaining of great pain if any attempt was made to straighten her knees, which were kept flexed at a considerable angle. After the free application of extract of belladonna and fomentations round the knees for some days, she commenced to move the joints satisfactorily. Cod-liver oil, iodide of iron and quinine were ordered, and she made a good recovery.

On the 24th August I saw the child again; she appeared well, except that she was troubled with a number of small boils about the shoulders and back. Her cheeks, chin and neck were rather disfigured by being deeply reddened in the manner frequently observed after a severe scald; the left angle of the mouth was a little puffy, and through the mucous membrane of that part of the lower lip small whitish dots were seen, presenting somewhat the appearance of a vaccination cicatrix.

Unfortunately the account of the early progress of the disease

in the lip in this case cannot be clearly given, and when I saw it first, the appearance of the lip had been much altered by the child constantly picking it.

Mr. T. Smith, in the third volume of the 'Clinical Society's Transactions,' thus describes the disease:

"It usually begins in a small itchy pustule, boil or vesicle upon one of the lips. This in a day or two after its rupture is followed by a firm œdematous swelling of the lip, nose and cheek, producing a hideous deformity. A few pustules or vesicles show themselves about the red edge of the lip, and the swelling extends, the surrounding induration being less defined than in carbuncle elsewhere. The pain is generally most intense, and the colour of the surface usually passes through the shades of bright red, dusky red and dark plum colour, until it is almost black, particularly about the red edge of the lip. Suppuration is slow to occur, but, if the patient live long enough, pus will form."

In the same paper he gives a report of two illustrative cases, in both of which a pimple, which afterwards became pustular, formed on the lip; this was followed by extreme swelling of the face. In both a scab came away from the lip, followed by the escape of pus; the swelling increased; hurried respiration and other symptoms of pulmonary affection came on, with rapid pulse and profuse sweating. Death occurred in both cases on the eighth day.

In his essay on "Carbuncle" in 'Holmes's System,' the same author gives the details of a case which occurred in the practice of Sir J. Paget, of which the following is an abstract:

A young gentleman noticed a pimple on his upper lip; on the third day there was much swelling with constitutional disturbance. On the fifth day the whole of the left half of the upper lip and part of the cheek were occupied by indistinctly defined carbuncular swelling; the carbuncle was incised. On the seventh pus was coming from the wound, but the swelling had increased, with more constitutional symptoms; on the eighth day *there was protrusion of the eyeballs and chemosis of the conjunctiva.* After this, for two or three days the man was almost unconscious—then he rallied a little; but pustules formed on his eyelids, secondary

abscesses showed themselves, and death ensued on the sixteenth day, having been preceded by pustular eruption on the abdomen and thighs, and by several abscesses.

"*During the last few days of his illness there had been noticed some fulness of the veins about the left eyelid, and induration about the lower part of the facial veins.*" The carbuncle was nearly healed.

Although my observations are principally confined to cases of disease affecting the lips, the following may fairly be mentioned as one of the same nature:

Dr. J. Chatterton, æt. 28, Coldstream Guards, died last autumn from the results of a small carbuncle in one nostril; one ala rapidly became swollen and indurated; the mischief soon involved the cheek. This was followed by great and painful swelling of the face—by rigors, pyæmia, and death on the eighth day. A post-mortem examination showed lobular pneumonia and pericarditis.

Mr. Reginald Harrison, Lecturer on Surgery at the Liverpool School of Medicine, has given me some notes of a case which he saw in consultation last year, and which probably was one of facial carbuncle, although the patient appears to have died before decided suppuration set in.

An office clerk, æt. 19, noticed a pimple at one angle of his mouth; the upper lip soon began to swell, and three days after, Mr. Harrison saw him. "The upper lip and one side of the face were much swollen. The swelling was tense, brawny, and of a purplish colour, and was proceeding to involve the side of the neck. There was no suppuration, and the skin presented, here and there, a peculiar tuberculated-looking appearance." The general condition indicated great prostration, with some cerebral disturbance. A free incision was made through some of the indurated textures; no pus was evacuated, but here and there, were small yellow-looking spots which appeared to be the *foci* of purulent deposits. Poultices, stimulants, and the ordinary remedies were prescribed; but no action took place in the wound, the general depression became more marked, and the patient died comatose on the eighth day after the pimple was first noticed.

M. Reverdin (to whose writings I shall refer again directly) says that he has noticed these yellow deposits in several cases.

He attributes them to a phlebitis or a periphlebitis of the venous radicles, set up by the carbuncle or furuncle, and considers them quite distinct from the "bourbillons" or cores which exist in the originating disease. In the case with which I commenced this paper, I noticed similar yellowish spots in the walls of the incision which I made under the jaw.

In the 'Gazette Hebdomadaire' (No. 46, November 13th, 1868) several cases are reported; and amongst them, one which shows how this peculiar affection may be overlooked. It is that of a young man, æt. 19, in whom immense swelling of the cheek, without any apparent cause, occurred. Passing over details, it is only necessary to say that, after presenting symptoms generally much resembling those which occurred in the cases I have just related, he died on the sixth day from pyæmia. On examining the interior of the mouth after death, carbuncular inflammation of the inner aspect of the cheek first affected was found, the mucous membrane being riddled with small holes, through which "bourbillons" could be squeezed.

In the 'Medical Times' for July 5th of this year, Dr. De Lisle, of Guernsey, relates the case of an actress who came under his care on May 25th, with a pimple on the upper lip; on the 27th he incised it and let out a few drops of pus; on the 31st the upper lip and left cheek were swollen and indurated, the left eye closed; pulse 140. Quinine, iron and strychnine was prescribed, with morphia and hydrate of chloral at night. On June 1st, crepitus was heard at the base of both lungs, and she was delirious; on the 2nd, the pulse was 170, the temperature 105; and on the 3rd June she died. No post-mortem was made.

The only case which I can remember at all resembling these was that of a man admitted into the Liverpool Royal Infirmary in March, 1867, under care of Mr. Bickersteth. His upper lip was nearly black; his nose and cheeks brawny, dusky red and immensely swollen. There were several pustules scattered about the upper lip and cheeks. Free incisions were made, poultices applied, stimulants and nourishment freely given; but the man became delirious, and died less than forty-eight hours after admission. He had been employed cleaning out cattle-trucks,

and it was thought that he might have inoculated a scratch on his face with some poisonous matter. Unfortunately I have no notes of the case; but to the best of my recollection it answered exactly to the description of the disease given by the late Mr. Harvey Ludlow in his article on "Carbuncular Inflammation of the Lips," in the 'Medical Times' for 1852. In that and the two previous years there had been an epidemic of boils and carbuncles, a large number of which had been treated at St. Bartholomew's Hospital, and amongst others, there occurred several cases of carbuncular inflammation of the lips, three of which proved fatal.

At first it was thought by the surgeons of that hospital that the disease could be attributed to the absorption through an abrasion of the lip of some poisonous animal matter; but this theory was afterwards abandoned, the disease "in the majority of instances manifesting itself in patients whose occupation and pursuits rendered the contagion of a poison improbable."

The most exhaustive treatise I have found on the subject is by M. Reverdin (Interne Lauréat des Hôpitaux), who, in the "Archives de Médecine" for June, 1871, publishes a long account of his "Researches on the cause of the peculiar danger of anthrax and furuncle on the face."

He relates at full length the history of several cases which came under his personal observation, and he says that he has "collected notes of a very large number of cases of carbuncle and furuncle attacking the face, fifty-four of which had terminated fatally, and others, although ultimately followed by recovery, had put the lives of those attacked in such jeopardy as to arouse the greatest anxiety." He also gives the locality of the affection in forty-five cases which terminated fatally, as follows:

In the Lips	Upper	17
	Commissure	3
	Lower	9
Nose (in 2 of these cases the upper lip also was involved)		5
Temporo-parietal region		4
Cheek		3
Chin		1
Angle of jaw		1
Eyebrow		2
		45

The termination of the disease appears to bear no relation to its original size or extent, but depends on its situation; and this is due (as Reverdin states) to the facility with which the disease is complicated by phlebitis when it occurs in the facial region, *more* especially when the lips are involved; and, it appears to me, *most* especially when the upper lip is attacked.

He says, "When we dissect the skin which covers the chin, and remove it as far as the lip, we come, near the free border, to a region where it is impossible to separate the skin from the subjacent tissues without cutting muscular fibres which are united to the integument; fatty tissue is absent—we find only integument (either skin or mucous membrane), muscular fibres interlacing in every direction, numberless vessels, glands, and amongst these structures some fine filaments of connective tissue.

"When furuncle developes itself in the commissures or free borders of the lips, inflammation of the special nature which characterises this affection soon attacks the scanty quantity of connective tissue; pus forms in immediate contact with the blood-vessels; the muscle will not stretch; the fibres, blending with or firmly attached to the integument, confine the pus, which cannot therefore be expelled at the proper time; the venous radicles inflame, the inflammation extends to their trunks; the face swells.

"As to the lip, it is hard and tense, giving to the touch the sensation of a sausage, or even of a piece of wood; its colour is purple or blackish: this tension shows the resistance which the muscular tissues offer to the material formed in its fibres. If we make an early incision we find little yellow islets (or patches) scattered about everywhere in the muscle, which surrounds and confines them."

Thus we see how a small carbuncle or furuncle sets up in the lip, especially, a violent form of inflammation, and gives rise to phlebitis. This phlebitis in its turn sets up the enormous swelling of the face which, as far as I can ascertain, is almost always observed. But phlebitis once set up in the face is especially fatal, owing to the free communication between the facial vein and the ophthalmic vein (leading to the cavernous sinus) at the inner angle of the orbit, and with the internal jugular vein in the neck; also, pro-

bably, as Mr. T. Smith points out in his article on carbuncle in Holmes's 'System'), in consequence of the facial vein being less flaccid in its walls and more patent in its canal than other external veins. We see here also why the most fatal seat of this disease should be the *upper* lip. When this is attacked, the nose is soon involved; the veins from both these parts empty themselves into the facial vein at the root of the nose, and it is not surprising then that the ophthalmic vein should be soon involved. In fact, in looking through as many recorded cases as I can find, I learn that carbuncle of the upper lip, especially, has been speedily followed by the symptoms of implication of the cerebral sinuses. In the other cases of facial carbuncle death has sometimes supervened in the same manner, but frequently from general pyæmia.

M. Dubreuil, in the 'Gazette Hebdomadaire,' (1873, No. 47), relates the case of a wretched half-starved lad who came under his care with furuncle of the upper lip, in whom phlebitis occurred, and, no doubt, involved the ophthalmic vein. He opened several abscesses, amongst others, one in the orbit. Two months after, the patient was still alive, although in a very feeble condition. The ultimate result of this case is not given. In a similar case under his care, in which also exophthalmos existed, and which resulted in death, pus was found in both ophthalmic veins and in the anterior part of the cavernous sinuses, the posterior part of these sinuses being shut off by clot.

Mr. Long, consulting surgeon to the Liverpool Royal Infirmary, in a paper on pyæmia, read before the Medical Society of Liverpool, related the following case:—"In 1857, I saw, in consultation with Mr. Higginson, a boy aged seventeen years who was suffering from a carbuncle of the lip. It was opened and in a few days followed by the formation of matter behind the eyeballs and lids, causing them to protrude unnaturally; an incision was made through the conjunctiva; the matter being much diffused, none escaped. The case resulted fatally, and at a post-mortem examination pus was found on the membranes of the brain, in both pleuræ, the pericardium, and through the lung substance generally."

I might have quoted many more cases recorded by French

surgeons, but I think I have brought forward a sufficient number to show the extreme liability to a fatal complication which exists in cases of facial carbuncle or furuncle, and the peculiar manner in which it is brought about. Of course many cases recover without any complication, but when once the œdema of the neighbouring part of the face has shown itself the prognosis must be grave; it shows that phlebitis has occurred in a region where phlebitis is always a serious matter. M. Reverdin has noticed that in some complicated cases a peripheral abscess (as he terms it) "has seemed to assist recovery;" probably it would be better to say "shows a tendency to recovery;" and he relates at length a case in which several small abscesses about the chin and below the jaw were opened by him. They occurred in the course of veins, and he distinctly made out obstruction of the anterior jugular vein. The patient recovered. I suppose that the abscess in the cheek of the girl whose case I have recorded was of the same nature. Such abscesses show the effect which nature or the patient's constitution is making to limit the blood-poisoning, and to prevent general pyæmia.

I propose now to say a few words on what appear to be the principal points to be observed in the diagnosis of this affection. My first impression, on seeing the case which I have recorded, was that it was one of charbon, and certainly there does appear to be a great similarity between the two affections. In fact, Dr. Budd, of Clifton, who contributed a series of papers (with illustrative cases) on "Malignant Pustule" to the 'British Medical Journal' for 1853, has insisted that the cases recorded by the late Mr. Harvey Ludlow are of the nature of charbon; and Billroth, in his 'Surgical Pathology,' includes both "charbon" and "facial carbuncle" under the term of "malignant pustule," and attributes them both to the inoculation of some poisonous animal matter.

But M. Reverdin says, "The presence of 'cores' (*bourbillons*) and pus on the one hand, and the absence of the gangrenous spot with its areola of vesicles on the other hand, should be sufficient for a sure diagnosis." Mr. T. Smith, in his article before referred to, quotes M. Bourgeois in support of the diagnostic value of the

presence or absence of pus. In all the cases recorded by Reverdin section showed either "cores" (*bourbillons*) or small deposits of pus infiltrated amongst the tissues in and about the seat of disease; in all the cases recorded by Mr. Ludlow pus was found either before or after death; but in Dr. Budd's cases, which appear to have been true "charbon," there was the black spot, the areola of vesicles, *and no trace of pus*. The swelling which occurs in charbon is merely the result of out-poured serum, perhaps mixed with the gas of decomposition; pus is never found infiltrated (Reverdin). Furthermore, the manner of death is different. The fatal cases of facial carbuncle or furuncle have succumbed either to phlebitis of the cerebral sinuses with its attendant lesions or to general pyæmia, whereas no appearance of such complications has been observed either ante- or post-mortem in those who have died of charbon, in which disease death results from rapid collapse, and after death the blood is found fluid and there is generally effusion of a little dark-coloured fluid into the serous cavities, and much congestion of the lungs, liver, and spleen. In facial carbuncle, death occurs in the same manner and with the same train of symptoms as when it follows carbuncle in other parts of the body.*

* To recapitulate.—

(*Malignant*) *facial carbuncle.*	*Charbon, or malignant pustule.*
Is not a specific disease.	Is the result of inoculation with an animal poison (generally through the bite of a fly).
Appears first as a pimple, which afterwards becomes pustular.	Appears as a pimple surmounted by a vesicle containing dark serum.
Contains "cores," which are discharged with pus, or are exposed by section of the part. The surrounding swelling is very painful.	Produces neither "cores" nor pus; but the central part of the sore becomes black, and is soon surrounded by a crop of vesicles, beneath which mortification extends. The slough is dry. The swelling is attended by little pain.
Results in death from phlebitis of the cerebral sinuses, or from general pyæmia, the various appearances of which are found on post-mortem examination.	Ends fatally in collapse, preceded by typhoid symptoms. After death the blood is found fluid; ecchymosis may be found in the intestinal mucous membrane, and there is a tendency to passive congestion and softening of the parenchymatous viscera. Decomposition is very rapid.

The question of diagnosis appears to be important. For although the general constitutional treatment should be the same in both diseases, *i. e.* the administration of nourishment, diffusible stimulants, tonics, especially quinine, yet the local treatment is different. In facial carbuncle, the non-fatal cases have for the most part been subjected to free incision of the originally diseased part, after which styptics may or may not be necessary to restrain bleeding (of course much hæmorrhage may be avoided by not cutting completely through the lip, thus avoiding the coronary arteries). In charbon, on the other hand, the only successful treatment has been to destroy thoroughly as soon as possible, with hot iron or caustic potash, the whole of the central eschar, with its surrounding areola of vesicles. In other words, to treat charbon as facial carbuncle would be useless; to treat facial carbuncle as charbon would probably be useless, and certainly would, in the event of the patient's recovery, cause an unnecessary amount of disfigurement. I am, of course, aware that the custom of freely incising carbuncles has given way to other modes of treatment, notably to pressure; but I do not see how such practice can be carried out when the lip is affected, and to my mind it appears pretty certain that, according to M. Reverdin's theory as to the course of this disease, an early incision must be the safest treatment. When once the general swelling of the face has taken place, we can only treat symptoms as they arise.

(The presence of Bacteria in the blood of patients affected by charbon has been noticed by some French surgeons, and it has been suggested that the raising of a small blister by the application of Liq. Ammoniæ, and examining the serum microscopically, might be practised as a means of early diagnosis.)

THE AFTER-TREATMENT OF LARGE AMPUTATIONS.

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The alterations in the treatment of large wounds which are from time to time suggested still leave room for further modifications, for we are far from having reached the most successful mode, or that which in its results gives unalloyed satisfaction.

The main feature of the present paper is the advocacy of the disuse of sutures, and the avoidance of all pressure in the shape of plasters and bandages in large lacerated wounds and primary amputations, where the skin and subjacent tissue have been much torn and contused, such, for instance, as a limb torn by machinery, where the bone has to be amputated some inches higher up, and there is skin to cover, but it is skin that has been much bruised and separated from its subjacent tissues, and consequently has its vascular supply greatly impaired; or, again, a secondary amputation, where the intermuscular spaces and the muscles themselves have become infiltrated with pus, and the patient has been reduced by profuse discharges and long confinement, and the amputation is resorted to as a *dernier ressort* to save the patient's life. In such cases the disuse of sutures would lead, not only to the formation of better stumps by avoiding sloughing or gangrene of any portion of skin, an occurrence so often resulting from the pressure put upon the skin by sutures when endeavouring to make the cut edges nicely approximate, but a far greater evil would be avoided—the grave constitutional effects, too often leading to a fatal issue, brought on by this same pressure of opposing sides, whose every vital action is thereby interfered with. When an attentive consideration is given to the state of a

limb after a severe injury, such as a large lacerated wound with much destruction, and consequent loss of substance, it will be found that the muscular fibre, cellular and adipose tissue, capillaries lymphatic and vascular, whose continuity has been abruptly severed, do necessarily exude during the immediate succeeding days a large quantity of half-organized material or plasma, above and beyond what is required to preserve the vitality of the tissues that are left. This vital plasma cannot be regarded as an inert substance; on the contrary, under its altered condition of exposure to air and light, it degenerates into another and probably lower form of vitality, and it then ceases to be a beneficent agent in contact with unimpaired tissue, and becomes a positively deleterious one, whose contiguity is replete with danger—a danger that is increased when, by careful approximation of the broad cut surfaces, as in the case of an amputation, we close a large number of mouths, and in this way block up every vessel, every capillary out of whose divided end material not required ought to be allowed to escape. But the most careful approximation will not prevent a good deal of surplus material welling forth and remaining between the flaps, here quickly to lose its inert character and become an irritant, and very rapidly a focus from which degenerative action may radiate. Such seems to be the explanation of the appearances so often observed to begin about the second and third days after an amputation in a limb put up in the ordinary way, with sutures, plasters, and bandages, particularly if the limb has been much lacerated or its structure impaired with infiltrations of pus. For about that time the flaps present a turgid appearance, and if not an actual general redness, there are streaks of a darkish red hue running up the limb; there is a general sloughy appearance of the edges of the flaps, the latter also having a dusky look, which extends from half to two or more inches in breadth; this gradually darkens, and all the skin and subjacent tissue which has assumed this appearance, be it much or little, half the flap or only a small portion, dies, separates, and, coming away, leaves what before promised to be a well-covered stump, bare, with bone exposed.

This I believe to be entirely due to pressure put upon the flaps

by sutures, plasters, pads, and bandages. It is even a question whether the fatal issue of an amputation within a day or two of the operation has not sometimes been brought about by the too careful closure of a large surface, whose structure may be in an unhealthy state, and its morbific material being thus forcibly retained, reacts upon the system. Certainly, when one sees a recent amputation, with its sutures imbedded deeply in the swollen skin, one cannot help feeling that to retain them there is fighting against nature, and can but lead to mischief of some sort, and we therefore let them go. But has not mischief already been done? And though we may remove the sutures in time to prevent gangrene of the strained skin, yet is it not probable that if we had left those edges free that there would have been no swelling at all, and if no swelling or engorgement then no throwing back upon the system of that surplus material which has been sent down, and so no alarming constitutional derangement?

The plan of treating large wounds at present adopted by those who keep in advance in the field of surgery is probably either that of Lister or Callender. The first is founded on the doctrine that no pus in excess need be formed, and since the plan has been introduced numerous striking instances of compound fracture treated on this principle have been related where there has been such rapid union of injured tissue, with so little expenditure of material in the form of increased secretion of any sort, as to justify the wonderful hold this mode of dressing has taken upon the minds of hospital surgeons. I would be most unwilling to detract from its value, simply maintaining that there are a certain class of cases, namely, those specified above, where it is powerless to prevent a large amount of new formative material being secreted, and that the attempt in such cases to carry out the plan, as it necessitates the close adaptation of parts, leads often to the sloughing of skin within the first few days by the undue strain put upon it, or to abscesses in the neighbourhood later on.

The most successful cases under Lister's method are compound fractures not needing amputation, abscesses, and small lacerated wounds. When we come to deal with a limb, one half of which

has been removed, the *status quo* is different, a fact too generally lost sight of. Here it is quite conceivable that we have often interfered injudiciously with nature's method of adapting supply to demand, and with her disposal of the surplus at first left on her hands, when we so carefully seal up the ends of a stump. She cannot at once contract the calibre of the supplying vessels, reduce the expenditure of force to the required amount, and diminish the supply to be transmitted to the mutilated limb. On the contrary, there is increase of action at first.

Mr. Callender's method, as representing, probably, the most perfect plan of those who do not believe in the power and influence of atmospheric germs, may be briefly summarised as follows:—The use of torsion rather than of ligatures to arrest hæmorrhage; the washing of the wound after all bleeding has been most carefully stopped with carbolic lotion; the bringing together of the flaps or sides of the wound with silver sutures; the fitting in of a drainage tube of improved construction, to secure for the first twenty-four hours the removal of all fluids, after which it is withdrawn; and, finally, in the after-treatment, the use of cotton wool as a first dressing, rest, isolation, and great attention to cleanliness—special means being adopted for attaining these ends.

To this plan of treatment it would be impossible to take exception save in two points—the use of sutures, and the substitution of torsion for ligatures. To speak of the latter first. In the hands of most surgeons, I think I shall not be wrong in saying, this method of arresting hæmorrhage from the larger vessels has often failed, and even where it has not, has been accompanied with a feeling of uncertainty, which is likely to prevent its ever coming into general use. There is the less necessity for adopting it now that the old form of ligaturing, and leaving one or both of the long ends dangling out of the wound, has been pretty well discarded, and ligatures either of carbolized catgut or silk, with ends cut quite short, substituted. These, as they come away in a day or two, are no source of irritation, and convey a feeling of security to the operator's mind, which the practice of torsion does not. It is a mistake to use so many ligatures; I have seldom,

even in the larger amputations, had to apply more than three; for the smaller arteries, torsion and the application of ice have never failed to arrest hæmorrhage. The subsequent washing of the wound with carbolic lotion blanches the surface completely.

The other point, that of bringing the flaps in all cases together with sutures, I object to for the reasons given in the first part of this paper. It was only after having met with a considerable number of instances where gangrene of a portion of the skin and subjacent tissue of the flaps and of others where grave constitutional disturbance had followed, which could be explained in no other way, that I came to the conclusion that these results were due to the pressure put upon the congested and contused flaps by the sutures. Where sutures are not used there is no occasion to introduce a drainage tube, as there is nothing to prevent the free escape of all fluids, and thus an objectionable foreign body, harmless though it may seem to be, is dispensed with.

In conclusion, a short account of four of the most recent cases treated on the plan advocated will serve to show, not only the success attending it, but the mode of carrying it out.

Case 1.—John E—, æt. 47, admitted into the Royal Southern Hospital on July 12th, 1873, with compound fracture of femur opening into the knee-joint, two scalp wounds, fracture of frontal bone, and fracture of left arm; fell from a ship's bow to the quay, about thirty feet. An attempt was made to save the leg, and for a long time he seemed to go on well, and it was hoped anchylosis of the knee-joint was steadily progressing; but early in September he began to fall off; large abscesses formed on the thigh; a great part of the outer condyle of femur was felt to be bare; he rapidly lost flesh; a bed-sore formed over the coccyx, and in October his state became very precarious. All hope of saving the limb was abandoned; it was even doubtful if amputation would save his life; he had sunk into such a state of blood-poisoning that a sickly, offensive odour emanated from him, and consecutive abscesses in other parts began to appear. As he was willing to submit to the operation, it was thought right to give him the chance, and on October the 16th the thigh was

removed about five inches above the knee-joint. The whole of the soft parts were found infiltrated with pus, and a portion of the femur above the fracture was found bare of periosteum. The flaps, which were of about equal length, were pale and bloodless, and pus oozed out from every part of them. He lost a moderate amount of blood, chiefly venous; three arteries were tied, and the ligatures cut short. The surfaces were well washed with carbolic lotion.

The flaps were not brought together, but the under flap was supported on a pillow with a good layer of cotton wool to rest upon; a covering of the same surrounded the upper flap, and thus the whole stump was imbedded in cotton wool without other dressing. He was very collapsed during the operation; it was even doubtful once or twice whether he would rally, the heart's action every now and then became so feeble. It was some hours before he could be removed from the table. In the course of the evening he became conscious, and was removed to bed, but it was not until the next day that he could speak. Fresh cotton wool was applied every day. The progress of the case need not be told in detail; it was steadily satisfactory, a free discharge of pus continuing from the first. The flaps drew together of themselves, well covering the bone. There was one circumstance which sufficiently showed the ill effects of pressure. On the tenth day I was induced to put three straps of plaster to hold up the lower flap, and facilitate the adhesion between the two. Within a few hours he complained of feverishness, loss of appetite, and not feeling so well; and the day but one after, when I again saw him, a blush of redness was noticed all round the thigh, and the latter had a full, swollen appearance. I removed the plaster at once, relying on the cotton wool alone, and in a few hours these symptoms subsided and he made a good recovery.

Case 2.—James M—, æt. 25, admitted October 4th; compound fracture of right thigh. He had slipped and fallen under the wheels of a moving railway waggon, by which the foot, leg, and lower part of the thigh had been crushed, and merely remained attached by pieces of muscle and skin. He was greatly

collapsed, having lost much blood, and without moving him from the trolly on which he lay, partly on his face, I amputated the thigh a few inches higher up, first securing the artery, and then trimmed the jagged ends of flaps, without removing more of the skin and soft parts than were actually in shreds. Thus a good deal of bruised tissue was left with which to cover the end of the bone. One or two ligatures were applied, and then after a good washing with carbolic lotion the stump was enveloped in cotton wool and comfortably arranged on a pillow. For some hours he lay in a partially unconscious state, after which he slowly rallied.

The cotton wool was daily removed, and fresh applied. There is a little difficulty in doing this, as after the first dressing it is apt to stick in the wound, but with a little care it can be picked off. To prevent decomposition, the outside of the wool was sprinkled with Calvert's carbolic powder. This case did well: none of the bruised skin died, and at the end of six weeks he left the hospital with a stump well covered both by muscle and skin.

Case 3.—Josiah W—, æt. 17, admitted October 21st. Had all the fingers and the thumb of right hand mangled by a circular saw. The skin on the dorsum of the hand was greatly lacerated, much of it having disappeared altogether; the thumb was gone, and the ends of all the metacarpal bones were fractured. The fingers themselves were mere pulps, only the skin on the palmar aspect of the third and fourth being intact. I removed all loose pieces of bone, also the ends of the metacarpal bones, but preserved the skin of the two fingers mentioned, this being the only skin left to cover a portion of the stump, two thirds having no covering but muscle. These two long strips were brought round and laid upon the dorsal aspect as far as they would reach, but no attempt was made to fix them there. The hand was laid upon a splint, and covered with cotton wool. There was no subsequent loss of tissue, not a particle of skin sloughed. After a few days the carbolic oil on lint was substituted for cotton wool, because the latter, adhering to the raw surface, became troublesome to remove. He has recovered, retaining a hand,

certainly without fingers or thumb, but which I have good hopes will prove more useful than none at all. Formerly we should have amputated in such a case at the wrist-joint.

Case 4.—Mary M—, æt. 8, admitted October 5th, 1873. Run over by tramway-omnibus, both arms being torn off, the one close to the shoulder-joint, the other a few inches lower down. The soft parts were much torn and bruised, so that in the amputations which I performed in about two hours after only about three inches of the humerus could be left on the one side, and the head of the bone merely on the other; there was then scarcely sufficient skin left to cover them. It was fully expected that the child could not survive such an injury many hours; the stumps were covered with the cotton wool, and she was placed in a cot. She slowly rallied, soon began to take food, and steadily progressed, making a good recovery. The stumps were dressed daily with cotton wool, the skin gradually closing over them. This poor little cripple, whom we almost wished would die, recovered without an untoward symptom.

In her case, as in the others, with the slight exception mentioned in Case 1, there was no interruption to the steady progress from the first towards convalescence.

Finally, the length of time occupied in the process of cure was not greater in these cases than in those where sutures were formerly used.

NOTES ON SYPHILIS.

By S. MESSENGER BRADLEY, F.R.C.S.

Subcutaneous Injection of Mercury in Constitutional Syphilis.

During the last year I have employed mercury subcutaneously in twenty-one cases of constitutional syphilis, all of which were carefully watched; I have not, however, met with results which much incline me to give this treatment a further trial. The preparations employed were the perchloride and bycyanide of mercury; the doses ranged from $\frac{1}{20}$th to $\frac{1}{10}$th of a grain, and the injections were administered, always under my own observation, two, three, and six times a week.

The cases selected afforded good tests of the value of the remedy. All were cases of constitutional syphilis which had not been treated with mercury either for the initial lesion or the constitutional affection. The nature of the secondary affection varied widely; in some ulceration of the soft palate was the only symptom, in others there were nodes, in others squamous or papular syphilides, in others rupia or gummata of the tongue.

Briefly to summarise my results, I found that the only cases which derived marked benefit were the cases of cutaneous affections, particularly when these were the milder forms of psoriasis or roseola; in three instances the syphilide disappeared very quickly from the skin, but in one case the patient presented himself at the hospital six weeks afterwards with a recurrence of the psoriasis.

The cases in which the mucous membranes were affected did not in a single instance derive perceptible benefit, and in all recourse was eventually made to other modes of treatment.

Nearly all the patients complained of more or less pain or incon-

venience from the injections. In some the pain was quite trifling, and the subsequent inconvenience slight. In several there was an unpleasant tingling or numbness of the arm experienced at the time, which was followed by long continued, and generally painful, indurations of the cellular tissue. In two cases the injections were followed by abscesses, and in one of these, a case of psoriasis with throat affections, in a pale young man of about twenty-five, phlegmonous erysipelas ensued with such extensive sloughing of the cellular tissue of the arm that for a time the life of the patient was in jeopardy.

Three patients failed to present themselves after the first or second administration of the injection, and so were altogether lost sight of.

None of the cases of tertiary syphilis, by which I mean the cases of rupia and gummata, were even relieved by the treatment, although in all the mercurial belt was subsequently worn with advantage.

Thus tabulating the twenty-one cases we have the following results:

No. of cases.	Nature of syphilitic affection.	Form and dose of mercury administered in fractions of a grain.	No. of injections.	Results.
1	Extensive facial rupia .	Hyd. Bicy. $\frac{1}{16}$	8	No improvement.
2	Gummata of tongue, with tubercular syphilides .	Hyd. Bicy. $\frac{1}{16}$	10	No improvement.
3	Rupia, with ulceration of leg	Hyd. Bicy. $\frac{1}{10}$	10	Increase of both during treatment.
4	Psoriasis, extensive . .	Hyd. Perch. $\frac{1}{12}$	12	Disappearance of psoriasis; recurrence in 6 weeks.
5	Sec. laryngitis, tubercular syphilide . . .	Hyd. Perch. $\frac{1}{12}$	12	No improvement.
6	Roseola	Hyd. Perch. $\frac{1}{10}$	6	Disappearance in 10 days.
7	Psoriasis	Hyd. Bicy. $\frac{1}{16}$	8	Disappearance in 14 days.
8	Syphilitic psoriasis of tongue	Hyd. Bicy. $\frac{1}{16}$	14	No change.
9	Syphilitic papules of scalp .	Hyd. Bicy. $\frac{1}{16}$	1	Patient failed to return.
10	Psoriasis with throat affection	Hyd. Bicy. $\frac{1}{16}$	2	Patient failed to return.
11	Painful post.-cervical adenopathy; fissures of tongue	Hyd. Perch. $\frac{1}{12}$	2	Patient failed to return.
12	Nodes on tibia; syphilitic maculæ	Hyd. Perch. $\frac{1}{12}$	20	Slight decrease in the periostitis.
13	Nodes on tibia; syphilitic ulceration of leg . .	Hyd. Bicy. $\frac{1}{12}$	28	No improvement.

No. of cases.	Nature of syphilitic affection.	Form and dose of mercury administered in fractions of a grain.	No. of injections.	Results.
14	Ulceration of soft palate .	Hyd. Bicy. $\frac{1}{10}$	6	Increase of ulceration during treatment.
15	Ulceration of soft palate; roseola	Hyd. Bicy. $\frac{1}{10}$	14	No improvement.
16	Ulceration of soft palate, &c.	Hyd. Bicy. $\frac{1}{10}$	16	No improvement.
17	Ulceration of soft palate, &c.	Hyd. Perch. $\frac{1}{16}$	6	No improvement.
18	Ulceration of soft palate; impetigo	Hyd. Bicy. $\frac{1}{12}$	18	No improvement.
19	Ulceration of soft palate; roseola	Hyd. Perch. $\frac{1}{16}$	8	Considerable improvement in roseola.
20	Ulceration of soft palate (rapidly extending) .	Hyd. Bicy. $\frac{1}{10}$	6	Increase during treatment.
21	Ulceration of soft palate .	Hyd. Bicy. $\frac{1}{12}$	10	No improvement.

These are not brilliant results, and yet I venture to affirm that they afford a fair criterion of the value of this mode of treatment. Let us consider sequentially the advantages claimed for this plan by its advocates. They are cleanliness, speediness of cure, small quantity of mercury employed, avoidance of irritating effects of mercury, and the exact adjustment and measurement of dose.

Cleanliness.—There is not a word to be said against this claim; whatever value it possesses is justly its due, although it is by no means clear why it is cleaner than the internal administration of mercury or even treatment by the bath.

Speediness of cure.—My own experience does not warrant me in subscribing to this claim, even though *cure* be translated "disappearance of the existing syphilide." The great majority of my cases derived no perceptible benefit from the treatment, which, on an average, lasted three weeks. Nor is it very certain that the rapid disappearance of a syphilide is a matter greatly to be desired; *longo morbo, longum remedium* seems particularly true in the treatment of syphilis; experience goes to prove that the cases which are really cured are those in which a very gentle action of mercury has been kept up for a very long time, *i. e.* from four to six months, so that, paradoxical as it may sound, this very rapidity of the apparent cure is perhaps an evil. Of course there are cases of constitutional syphilis in which it is very desirable to produce a speedy effect; this is especially true in cases of syphilitic iritis;

in these cases, however, the frequent and considerable inunction of mercury will most frequently answer every hope, but if this or the internal administration of mercury should fail, in such cases, by all means, trial should be made of the method of subcutaneous injection. In fact, I am of opinion that it is in these cases, and in these cases only, that the method will live.

Small quantity of mercury employed.—This is purely hypothetical. It is quite as likely that in inunction, fumigation, or the internal administration of mercury, only a very small portion, an equally small portion with the quantity introduced beneath the skin, is actually absorbed. In the subcutaneous injection the entire dose rapidly finds its way into the system, when it produces its full effects, but it is certain that in none of the other modes is this the case. This uncertainty as to the exact quantity which will be absorbed in fumigation or inunction is, so far as it goes, an objection, but practically it is more apparent than real. We find in actual practice that we are easily able to regulate the exact effect we want to produce upon the gums and system generally, either by the baths or by inunction.

The homœopaths employ a preparation which they term *mercurius dulcis No.* 1, which consists of calomel and finely levigated sugar of milk in the proportion of one per cent. of the mercurial. I have for some years given this preparation from time to time, and have frequently produced violent purgation with a five-grain dose, which is equal to $\frac{1}{20}$th of a grain of calomel. From this it seems probable that when we give large doses of mercury only a small portion is actually absorbed, the greater quantity passing off by the bowels.

Avoidance of irritating effects of mercury.—This is not always correct. In one case in which I employed this method diarrhœa followed as a consequence, ceasing on the cessation of the remedy. Whatever truth, however, there be in this plea is quite equally true of the two other methods of treatment before alluded to.

Exact adjustment and measurement of dose.—This is quite a point in favour of this mode, and if its other claims were as good would unquestionably establish it on firm grounds. For no other treatment can this be claimed, and it is very interesting to notice how very small a quantity of mercury is in some cases sufficient

to effect a cure. For example, in none of my cases in which benefit was derived was there more than $2\frac{1}{4}$ grs. of mercury administered, and in one case (No. 6) cure apparently followed the exhibition of $\frac{1}{3}$ths of a grain of the perchloride.

Having now glanced at the advantages claimed for this treatment let us briefly review its disadvantages. They seem to be: probable loss of patients, pain caused by the injections, the occurrence of abscesses or of phlegmonous erysipelas, and the chance of a fatal case.

Probable loss of patients.—When patients are boxed up in a hospital this objection of course does not hold, but when "men may go and men may come," when they are free as private or even out-patients of a hospital are free, then there is much probability in many of them declining to return for the administration of the injection. In three of my hospital cases this actually occurred, and in private practice this must always operate as a real objection.

Pain caused by the injections. — Frequently this is trifling enough, but is never quite absent, and in some cases is really severe. When other modes are absolutely painless this is in itself a positive disadvantage, though by no means the principal one to be alleged against this mode of treatment. The pain at the time wears off in something like an hour, but is very frequently followed by indurations of the cellular tissue, which may, it is true, themselves be painless, but which, on the other hand, may be followed by abscesses, which is the next objection to be urged against this mode of treatment.

The occurrence of abscesses.—In two out of the twenty-one cases in which I employed subcutaneous injections abscesses followed. This I fancy is about the proportion in which they will be found to occur, that is, in ten per cent. of the total number of cases. Although I am aware that some advocates of the plan have met with more fortunate results, I am inclined to believe that this is due to limiting the adoption of the treatment to cases in which the syphilides are very recent and the system little vitiated by the poison. In both the instances I record the

abscesses were accompanied with severe pain, and in one case were followed by an attack of phlegmonous erysipelas.

Phlegmonous erysipelas.—This constitutes a real danger. In the case I record there was nothing in the appearance, age, or previous history of the case to lead one to suppose that he was prone to erysipelatous affections. The cellulitis, however, which ensued was severe, was followed by considerable sloughing, and for a time the life of the man was in peril. This leads me to consider the last objection to this plan of treatment.

The chance of directly causing death.—When we remember the cachectic condition which syphilis itself tends to produce in the system, and the local irritation to which mercury is prone to give rise, we cannot wonder at the occasional occurrence of phlegmonous erysipelas, and it must be admitted that in no case is phlegmonous erysipelas unattended with direct danger to life. It is consequently almost certain that if this mode of treatment were to meet with general adoption a fatal case would by-and-by occur, which seems to me to constitute a very grave, indeed, insuperable objection to its acceptance. When we reflect how absolutely safe and eminently successful are the ordinary methods of treating syphilis, it is a necessary moral sequence that a single death directly attributable to the treatment must be fully and finally fatal to any scheme which cannot boast immense advantages over those already in practice.

In fine, as I stated at the commencement of this note, I am so well satisfied with other modes of treatment, notably the mercurial bath for private patients and the plan of inunction and the mercurial belt for hospital cases, that I do not see anything to be gained in the adoption of the treatment by subcutaneous injection.

ON CERTAIN IMPROVEMENTS IN THE HINGED SHORT FORCEPS.*

By FRANCIS VACHER.

In my paper descriptive of, and remarking upon, a new form of midwifery forceps, issued last year, I stated that though convinced the principle on which my instrument was constructed was sound, I could not pronounce it a perfect short forceps. Indeed, in the course of the first delivery it accomplished, one defect, viz. the position of the button commanding the steel snap, became apparent, and since then two other flaws in the original design have discovered themselves, one, the instrument's extreme shortness, and the other, its want of some modification which would enable the operator to unlock and withdraw the blades without previously returning them into the hollow of the sacrum. These three imperfections I have, with the kind assistance of Messrs. Weiss and Son, whom I personally consulted on the subject, been enabled to correct. In what manner will be seen at a glance by comparing the accompanying cut with the illustration to my former paper.

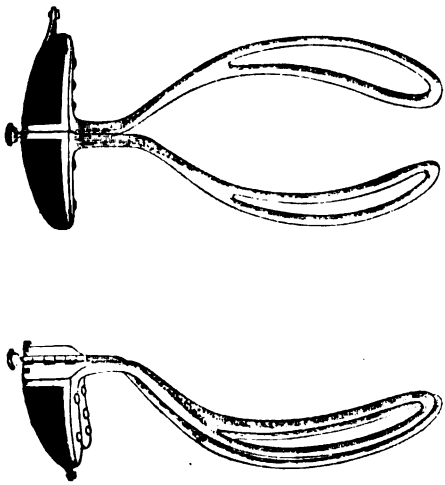
In the first place the catch which locks the blades when *in situ* is controlled from the end of the half of the handle attached to the upper or outer blade instead of from the front of the half of the handle belonging to the lower blade, so that with the new instrument there is no possibility of an operator involuntarily unlocking it by the pressure of the palm of his hand during traction.

Secondly, inasmuch as this forceps is intended for effecting delivery of the head when in the pelvic cavity, no less than when it has in great part passed through the outlet, I have found it

* An Appendix to "Remarks on a New Midwifery Forceps." 'Liverpool and Manchester Medical and Surgical Reports,' 1873.

necessary to increase its length by removing the clamps a little further from the handle by the introduction of strong shanks an inch and a quarter in length.

Thirdly, it having been pointed out to me that should delivery prove impracticable after traction had been sufficiently long tried it would be an advantage to be able to separate the blades, and remove them right and left in the ordinary way, I have had the hinge rivet fitted with a head to allow of its being readily drawn.



It will be observed also that the black wood handle previously figured chequered now appears plain, as I intended it should be in the first instance, having found by experience how very troublesome it is to keep clean handles of any instruments mounted in chequered wood.

I have only to add that the hinged forceps, as now re-submitted to the notice of the profession, while obviously more useful than the pattern at first planned, is so little increased in size and weight that it is still, I believe, the smallest, lightest, and most portable short forceps devised.

FIVE YEARS' SURGICAL WORK

IN THE

MANCHESTER ROYAL INFIRMARY.

By EDWARD LUND, F.R.C.S.,

ONE OF THE SURGEONS TO THE HOSPITAL, AND MEMBER OF THE SENATE OF THE OWEN'S COLLEGE, MANCHESTER.

In publishing the following details of five years' surgical experience in the Manchester Royal Infirmary I have two objects in view,—the one to show in what such practice consists and the extent of it; the other to illustrate in a practical manner the advantages to be gained by attention to that method of reporting surgical cases in hospital practice which I described more fully in the last volume of the 'Liverpool and Manchester Medical Reports.'

It may almost be regarded as the bounden duty of a hospital surgeon, who is indebted for his public position to the sanction and support of his professional brethren, to lay before them, at stated periods, some account of his stewardship, and to show what has been gained, from time to time, in the larger field of experience which he possesses, and thus to give back to his fellow-workers in scientific research any new facts he may have noted, or any improved methods of surgical treatment. In the plan here followed for registering the reports, I have kept an exact record, with my own hand, of every case treated by me in our surgical wards during the five years ending December, 1871, and in carrying out this self-imposed task, which I undertook on my appointment as one of the acting surgeons of the hospital, I have been greatly aided by the courteous assistance of those gentlemen who filled the office of senior house-surgeon in succession each year during that time; and with great pleasure I mention the well-known names of Messrs. Woodcock, Fennel, Pinder, Boutflower,

and Carruthers, who can each bear testimony to the general accuracy in detail of these reports, as they remember how they looked on patiently while I noted with unbroken regularity from day to day, in my peregrinations through the wards, the special points of interest in each case—a process which might seem to them needlessly minute. In this quinquennial period, from January, 1867, to December, 1871, 1309 surgical cases were admitted under my care in the wards of our hospital, 977 of whom were males and 332 females, and amongst which 75 deaths occurred. Of course a certain proportion of the cases were acute in their nature and were truly accidental, the others coming under the category of surgical disease. In attempting to estimate, from these reports, the average number of in-patients of the entire hospital, it must be borne in mind that the numbers here quoted, so far as they refer to cases of accident or emergency, if multiplied by six would give very closely the total average number in the hospital attended by the surgical staff, but, in surgical disease, and in cases of great importance, where the time for admission is not urgent, a much larger proportion have without doubt fallen to the share of my colleagues,—men who are my seniors in office, and who, by reason of their greater repute and greater experience, would be more likely to be selected by the friends of patients, so admitted, as the operators in important cases. Hence it is that, in this record of my surgical cases, a very small proportion of the larger operations in surgery will be noted, as compared with those of more general or ordinary occurrence. I cannot attempt to describe in detail all the cases contained in these reports, or even a tithe of them, but I will indicate as I deal with each class in succession and each subclass and division those cases which have been of the greatest interest, or to which the greatest amount of practical or scientific importance can be attached. As to the various causes of the different accidents which I have herein reported I have made special inquiries to ascertain how far, in the ordinary course of things, a certain proportion of them might be accounted as avoidable or preventible. In the workshops and factories of our city the authorised Government inspectors are sufficiently active in their duties to detect, and as

quickly to correct, any general failure of precautions in such matters, but there is a cause of frequent disablement amongst the working classes, namely, drunkenness, which is in truth a preventible source of injury, and which these records show has had its usual influence upon the returns; in contusions and sometimes fractures; in burns and scalds; and, as the climax of all, in the perpetration of suicidal wounds. The excitement of drink, or perhaps the insufferable depression and the wretched melancholy which follow in its train, have determined the loss of health, of limb, and even of life. The tale thus simply told in these records must point its own moral. In some of the tables, such as those for burns and scalds, I have indicated those special statistics by a particular arrangement of the enumerating figures. Thus, for each period or epoch of life there are two columns reading from left to right, males and females. Then each of these has cut off from it by the lines of the text a square space, in the four corners of which when needful four numerals are placed, commencing with the left upper corner, where the number and cause of the injury at that particular age is placed, and on the right the deaths. Below, at the left-hand corner, the number of cases in which, at the time of receiving the injury, the patient was under the influence of drink, but yet recovered; and opposite to it, in the right-hand bottom corner, we read the deaths which may have occurred under the double influence of poison by alcohol, and the chances of the accident. At first in making up these returns I felt inclined to go on the good old principle *de mortuis nil nisi bonum*, and to class these latter individuals simply with the deaths, but it has occurred to me that as no personal reference is made to the victims of this vice a distinction might serve to show, on public grounds, how bad habits, which at first seem innocent or inoffensive, may yet become a mighty cause of misery and death. Fortunately, in my records such cases as these are few and far between.

The following list, which will serve as an index to the subject matter of this paper, shows how I have classified the cases by arranging them under eight chief classes, dividing these, according to circumstances, into sub-classes, divisions, and sub-divisions, as seemed needful.

CLASS I.

A. CONTUSIONS. 142
- *a.* Head.
- *b.* Face.
- *c.* Chest and Back.
- *d.* Abdomen and Pelvis.
- *e.* Hip and Lower Limbs.
- *f.* Shoulder and Upper Limbs.

B. WOUNDS. 122
- *a.* Contused.
- *b.* Lacerated.
- *c.* Punctured.
- *d.* Incised.
- *e.* Gunshot.
- *f.* Scalds and Burns.
  - 1. Scalds. 25
  - 2. Burns. 42

C. AMPUTATIONS. 61
- *a.* Accident.
- *b.* Disease.

D. ULCERS. 82
- *a.* Simple.
- *b.* Indolent.
- *c.* Varicose.
- *d.* Eczematous.
- *e.* Syphilitic.
- *f.* Epithelial.

CLASS II.

A. HERNIÆ. 25
- *a.* Umbilical.
- *b.* Inguinal.
- *c.* Femoral.

B. TUMOURS. 21

a. Fatty.
b. Fibrous.
c. Cystic.
d. Glandular.
e. Myeloid.
f. Malignant.

C. ABSCESSES. 40

a. Head, Neck, or Chest.
b. Shoulder.
c. Arm.
d. Forearm.
e. Hand.
f. Lumbar.
g. Psoas-iliac.
h. Pelvic and Inguinal.
i. Buttock and Hip.
k. Thigh.
l. Leg.
m. Foot.

CLASS III.

A. DISEASES OF BONE. 56

a. Caries and necrosis.
1. Cranium.
2. Face.
3. Scapula.
4. Humerus.
5. Ulna.
6. Radius.
7. Hand.
8. Vertebræ.
9. Femur.
10. Tibia.
11. Fibula.
12. Foot.

B. Diseases of Joints. 70
- *a.* Sterno-chondral.
- *b.* Elbow.
- *c.* Wrist.
- *d.* Hip.
- *e.* Knee.
- *f.* Ankle.
- *g.* Foot.

C. Excision of Joints. 8
- *a.* Elbow.
- *b.* Knee.
- *c.* Astragalus.

D. Sprains near Joints. 25
- *a.* Wrist.
- *b.* Knee.
- *c.* Ankle and Foot.

E. Inflamed Tendons and Thecæ. 7
- *a.* Wrist and Hand.
- *b.* Knee.
- *c.* Ankle and Foot.

F. Bursæ near Joints. 9
- *a.* Elbow.
- *b.* Knee.
- *c.* Ankle and Foot.

G. Loose Cartilages. 1
- *a.* Knee-joint.

H. Talipes. 2
- *a.* T. varus.

CLASS IV.

A. Dislocations. 5
- *a.* Shoulder.
- *b.* Elbow.
- *c.* Hip.

B. FRACTURES. 304

a. Simple.

1. Face.
2. Clavicle.
3. Humerus.
4. Ulna.
5. Radius.
6. Ulna and Radius.
7. Hand.
8. Ribs.
9. Pelvis.
10. Femur.
11. Patella.
12. Tibia.
13. Fibula.
14. Tibia and Fibula.
15. Foot.

b. Compound.

1. Face.
2. Humerus.
3. Femur.
4. Tibia and Fibula.

CLASS V.

A. ARTERIES. 15

a. Wounds.
b. Atheroma.
c. Aneurisms.
d. Ligature of Femoral.
e. Ligature of External Iliac.

B. VEINS. 2

a. Varicose, ligatured.
b. Varicocele, ligatured.

CLASS VI.

A. BRAIN. 34

a. Concussion.

b. Epileptic Fits.
c. Fracture of Skull.

B. SPINAL CORD. 20
a. Concussion.
b. Paralysis.
c. Fracture of Vertebræ.
d. Diseased Vertebræ.
e. Tetanus.
f. Neuralgia and Neuromata
g. Infantile Paralysis.

CLASS VII.

A. BLADDER. 35
a. Irritable.
b. Cystitis.
c. Prostate.
d. Lithotomy.
e. Lithotomy for Foreign Body.
f. Hæmaturia.
g. Vesical Fistula.

B. URETHRA. 28
a. Laceration of.
b. Calculus in.
c. Stricture, Traumatic.
d. Stricture, Organic.
e. Holt's Operation.
f. Syme's Section.

C. PENIS AND SCROTUM. 11
a. Phymosis Operation.
b. Paraphymosis.
c. Syphilitic Ulceration.

D. TESTIS. 10
a. Orchitis.
b. Epididymitis.

c. Hydrocele.
d. Hydrocele, Radical cure.
e. Castration.

E. Breast. 22
a. Abscess.
b. Recurrent Fibroid Tumour.
c. Scirrhus.
d. Carcinoma.

F. Ovary. 8
a. Ovarian Tumours.
b. Ovariotomy.

G. Uterus, &c. 16
a. Prolapsus.
b. Tumours.
c. Vaginal Fistulæ.
d. Cancer.
e. Contusion of Vulva.

CLASS VIII.

A. Eye. 5
a. Injury to Orbit.
b. Tumour in Eyelid.
c. Pannus Corneæ.
d. Iritis, Specific.
e. Iridectomy for Glaucoma.

B. Ear. 2
a. Congenital Displacement.
b. Carcinoma of Auricle.

C. Nose. 4
a. Lupus.
b. Ozæna.
c. Polypus.

D.	**Mouth, &c.**	15
	a. Harelip.	
	b. Abscess of Tongue.	
	c. Ranula.	
	d. Epithelioma of Lip.	
	e. Epithelioma of Tongue.	
	f. Epulis.	
	g. Cleft Palate.	
	h. Tumour of Palate.	
	i. Ulceration of Fauces.	
	k. Stricture of Œsophagus.	
E.	**Larynx and Trachea.**	15
	a. Specific Ulceration.	
	b. Tumour.	
	c. Tracheotomy.	
	d. Cut Throat—Suicide.	
F.	**Rectum.**	20
	a. Condylomata.	
	b. Hæmorrhoids.	
	c. Abscess near to.	
	d. Fistula.	
	e. Malignant Disease.	
	Total number of cases	1309

In the first class we find ordinary bruises, or, as they are technically called, contusions, in which I have followed strictly the legal definition that these differ essentially from wounds, there being with them no true breach of surface. Of these I have had, under treatment, 142 cases arranged in sub-classes, as here shown, from which we find that the greatest number have occurred upon the hip, lower limb, and chest, the others being pretty equally distributed over the head, face, and extremities. As to the causes, they are as variable as possible.

TABLE I.

CLASS I.—A. Contusions.

Part injured.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Head	2...	1 ...	1...	.....	5...	1...	.....	.....	1 ...	.....	9...	2...
	.....	.....	.....	.....	4...	1...	2...	.....	.....	.....	6...	1...
b. Face	1...	.....	1...	.....	.....	1...	.....	.....	.....	.....	2...	1...
	.....	.....	.....	.....	1...	1...	.....	.....	.....	1 ...	1...	2...
c. Chest and back	5..	.....	7...	3 ...	14 1	.....	4...	.....	.....	.....	30 1	3...
	.....	.....	1...	.....	4...	1...	1...	.....	.....	.....	6...	1...
d. Abdomen and pelvis	.....	.....	3...	.....	3...	.....	4...	.....	.....	.....	10...	.....
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
e. Hip and lower limb	5...	.....	9...	.....	23...	7...	3...	2 ...	5 ...	2 ...	45...	11...
	.....	.....	.....	.....	2...	.....	1...	.....	.....	.....	3...	.....
f. Shoulder and upper limb	1...	.....	3...	.....	1...	1...	2...	.....	.....	.....	7...	1...
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	14...	1 ...	24...	3 ...	46 1	10...	13...	2 ...	6 ...	2 ...	103 1	18...
	.....	.....	1...	.....	11...	3...	4...	.....	.....	1 ...	16...	4...
											119 1	22...
											142	

In every case the injury has been so great as to necessitate the admission of the patient into the hospital, and if it should seem that the number is small, it must be remembered that, a very large proportion of such injuries as these are treated in our accident room, and remain outside the hospital. Therefore, in every case here reported there must have been some special reason for the admission of the patient into the wards. As to the general treatment of these cases, my experience has shown me that where the skin is unbroken there is no better application than spirits of wine or alcohol in some form. It acts as a constant stimulant to the capillaries of the surface, and keeps up that degree of vital action which, from the injury received by the contusion, it might fail to retain. I was first led to adopt this practice of always using spirits of wine as one ingredient in lotions for bruises and contusions, by being told that in the large fire brigades in London, where men, otherwise in good health, are exposed to sudden injuries by the falling of timber, bricks, stones, &c., whilst ex-

tinguishing fires, it is found that greater success attends the use of dilute spirits of wine as an application to the bruised surface than any other agent; and from experiments which have been tried with what is known in ordinary pharmacy as the tincture of arnica, and other alcoholic tinctures, it is highly probable that the spirit portion of the compound, rather than the vegetable extract, is that which chiefly acts as a stimulant to the surface. Occasionally, however, in the treatment of ordinary contusions, apart from rest, which is so essential for the recovery of such injuries, I have used the old-fashioned linseed poultice as a fomentation, generally adding to it a very large proportion of tincture of opium in cases where local sedative action was desired. I learned the value of this application from reports published by Dr. Meadows, of the Hospital for Women, Soho Square, London, in which it was stated, that after the very serious operation of ovariotomy, excellent results have attended the application to the abdomen, on the closure of the wound, of a poultice, of considerable size, made of linseed meal and hot water, with which is fully incorporated a very large proportion (fully half an ounce, or in some cases one ounce) of tincture of opium. That opium, so applied in the form of tincture, can be directly absorbed through the pores of the skin I think no one will deny, for it is often found of the greatest possible service, not only in injuries to joints, but in acute and sometimes chronic mischief, and many people, who cannot take opium by the mouth, will derive benefit by its sedative action when absorbed through the skin. I here mention the use of linseed poultices, not as an application to wounded surfaces, for I have entirely discarded their use in wounds, but only to contusions where the skin is unbroken. On one or, at the most, two occasions during the period covered by these reports in my practice in the Infirmary, has such an application been made to wounds or abscesses, and then without my knowledge, and never persevered in by my permission. Thus, I look upon the linseed poultice as a convenient means of securing warmth and moisture as a fomentation, but not to be sanctioned as a dressing for open wounds.

Of all the cases here mentioned there is but one which needs

special reference, and that is a case in which I observed that very unusual and very peculiar condition of *punctiniform ecchymosis*, which has been thought to be indicative of the previous existence of tension of the vascular system, associated with threatened strangulation. It occurred in the person of a little boy, aged six years, who was crushed between the wheel of a lurry and a gate, and was brought into the hospital with extensive contusion over the left side of the face and head, with sub-conjunctival ecchymosis in the left eye, compression of the front and back of the chest, with very superficial ecchymosis of a red colour, and decidedly punctiniform, so that when carefully looked at the whole surface was found to be studded with vascular spots of star-shape form, sprinkled pretty equally over the whole of the trunk. These were, doubtless, separate spots of extravasated blood, produced by the bursting of small capillary vessels. This condition of things was associated with a good deal of distress in breathing and some confusion of intellect, a little simulating concussion, perhaps due to general faintness, from which the boy rallied in a few hours; he remained in the hospital five days, and ultimately recovered completely. Day by day I noted a slight change of colour in these vascular spots, although they did not run through all the shades, from blue to green and yellow, of ordinary ecchymoses. I have seen instances of this same kind of ecchymosis in a few cases where death has been caused by compression of the chest. During an alarm of fire at a large music hall in this city, a number of persons were knocked down and crushed to death, nearly twenty of them being brought to the infirmary dead. Out of that number I observed four or five in whom this peculiar condition of the surface was to be detected. It seems to indicate the greatest possible jeopardy to the persistent circulation of the blood, and might in some few cases (as in threatened strangulation during criminal assaults) be of service in determining some medico-legal questions.

In the second division of the first class I have placed wounds, and these I have broken up into five sub-classes, as shown in the annexed table.

Table II.

Class I.—B. Wounds.

Class of wound.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Contused	3	...	7	1 ...	12	1	6	...	3	...	31	1 1
	...	...	1	...	...	....	2	...	...	...	3	...
b. Lacerated	7	1	20	4	10	1 3	4	1 ...	1	1	42	2 9
	...	...	...	...	1	2	1	...	...	...	2	2
c. Punctured	2	...	1	1	1	1	2	...	...	...	6	2
	...	...	...	...	...	...	1	...	...	...	1	...
d. Incised	...	...	3	...	6	...	...	...	...	...	9	...
	...	...	...	...	2	...	...	...	...	...	2	...
e. Gunshot	1	...	1	...	3	...	1	1 ...	1	...	7	1 ...
	...	...	...	...	...	...	1	...	...	...	1	...
	13	1	32	1 5	32	1 5	13	2 ...	5	1	95	4 12
	...	...	1	...	3	2	5	...	...	...	9	2
											104	4 14
											122	

The contused, lacerated, punctured, and incised wounds have all been treated much upon the same principles as have regulated my practice in wounds generally. Those in which the contusions were excessive required more care than the lacerated, and these more than either the punctured or incised, assuming that by the infliction of the wound no very important part had been damaged. The one grand principle of treatment which has regulated my conduct has been the avoidance of putrefaction on the surface of such wounds; and to relate the various preparations which I have employed during the five years, would be to describe a course nearly parallel to the history of antiseptic surgery during this period. I commenced, before I had the advantage of learning Professor Lister's views on this matter, with the watery solution of carbolic acid; and even before I knew he had undertaken to investigate this subject, both practically and theoretically, I had given instructions to my dressers to use, in every wound we had to treat, such a quantity of this solution that at all times the dressing should smell slightly of the agent employed. But I soon discovered that, from its volatility,

this condition of things could not be long preserved, and that the watery solution of the acid, although efficacious when used in certain ways, fails to be of service if carelessly employed, and many wounds, when treated with carbolic acid lotion, will, in a few hours after its application, present all the phenomena of advanced putrefaction. I therefore gladly availed myself of Prof. Lister's first suggestion to use the acid mixed with oil, for I soon found that this combination retained the antiseptic properties for a much longer period. Again, it was found that a mixture of glycerine and the acid was rather less unpleasant to use, and equally serviceable, except in those rare cases where, from some peculiarity of the skin, glycerine itself irritates excessively. These three applications, therefore—the watery solution, the mixture with oil, and the mixture with glycerine—formed our staple dressings for wounds of this class. In gunshot wounds, especially, I have found very great benefit from the oil dressing, and I am inclined to think that in military practice it will be the most acceptable and generally useful. In order to correct the irritating effect of the carbolic acid which is apt to occur upon some skins, I combined with it some salt of lead, either the dia-acetate, as in the ordinary lead lotion, mixed with the watery solution of the acid, or the nitrate of lead dissolved in the same manner, and which seems to be superior to it in producing a less deposit of white concretion upon the surface. By this admixture of lead with the watery solution of carbolic acid we may often gain great benefit without the attendant inconvenience of local irritation.

Among the incised wounds the most interesting was the following, and seeing that it terminated so fortunately I think it well to place it on record. It was the case of a man, aged twenty-five years, a smith by trade, who, it is reported, whilst under the influence of drink and in a very excited state, on account of some quarrel with his wife whilst at dinner, took up a large knife—I believe a carving knife—and cut deliberately through the palm of his right hand, just at the lower part, close to the roots of the fingers and a little above the level of the heads of the metacarpal bones. When admitted shortly afterwards, Dr. Carruthers, then acting as house-surgeon, reported that he could see the bones at the

bottom of the wound, and that all the super-adjacent structures had been divided, including, of course, the tendons. The reason assigned for such an insane act was some determination which he had arrived at, that no more work should be done by this bread-winner of the family. He was admitted into the infirmary and I saw him very shortly afterwards. I poured into the wound a very strong and almost saturated solution of tannin, which I was at that time experimenting with as a dressing for wounds, thinking it might possess some preservative antiseptic properties, but further experience of it proved this to be fallacious. I so arranged that none of the solution remained at the bottom of the wound after it had to some degree arrested the somewhat sharp hæmorrhage. Over the whole was placed a thick pad of lint thoroughly saturated with the same tannin solution, the hand was flexed and folded inwards and so retained by narrow bandages; the man was placed in bed, the limb raised upon the pillow and lightly tied to the upper part of the bed, so that it could not be disturbed during sleep, and in that way it was retained for six clear days. On account of the peculiar circumstances of the case, as soon as the man recovered from the fit of excitement I have described, he became so painfully alarmed at the possible effects of his self-inflicted wound that I had no difficulty whatever —chiefly through the influence of fear—in making him keep the limb absolutely quiet. The result was that on the sixth day, when I examined the wound, it was found to be united as nearly as possible in its whole length, and by the continuance for a few days of similar treatment, succeeded by the use of what is known as the red lotion—a solution of sulphate of zinc in water with spirits of lavender—the wound healed up perfectly within fifteen days. He then became an out-patient and was watched for some time afterwards, for this reason, that being connected with some sick club he attempted to get compensation for what he represented as an accidental wound. I am not certain how the case was settled, but I believe he received some gratuity in consideration of the delirious state he was in at the time the wound was inflicted. With regard to the effect upon the divided nerves, the following are my notes six weeks after he left the hospital and

almost nine from date of injury:—"He now has great power to move the fingers of the right hand, but there is loss of sensation on palmar side of radial half of ring finger and both sides of middle and index finger. At the tips of these are slight ulcerations, with vesicles." Fourteen days afterwards I note—"the ulcers at the tip of the ring finger healing; vesications on middle of palmar surface of middle finger, none on index finger; old wound is perfectly healed." About three weeks after this I note—"All the vesications are healed; can move fingers and hand to a wonderful degree; can only feel in the thumb, and not in the little finger, and hardly at all in any of the others. Recommended to keep hand very warm during approach of winter." I saw this patient some months afterwards, and the constant feeling of numbness in the fingers was the only symptom which indicated the amount of injury which had been received, for there was a very serviceable degree of tactile sensation.

None of these wounds presented anything very peculiar, except those connected with gunshot injuries, and in this class, although in a non-military hospital, some cases of considerable interest have occurred. One of the most peculiar was that of a man, aged thirty-two, who, about five months before his admission into the infirmary, had sustained a gunshot wound from the explosion of a double-barrelled gun while firing it. Part of the stock of the gun had lacerated the left forearm on its internal side; the wound was two inches long, and was partly healed up in about three weeks, but never completely so, as there always existed at the lower part of it a small sinus or aperture. This remained open until the time of his admission into the infirmary, which was nearly five months from the date of the accident. During this long period it was observed that from time to time he was liable to sudden bleedings from the wound, particularly after slight muscular exertion or any peculiar movements of the limb. When I saw the case I determined to place him in the hospital, and, if necessary, to cut down upon the track of the wound and remove any portion of bone or foreign matter which might be found there. He was first taken into the hospital with the object of merely watching him to see if it

was really true that he had these sudden attacks of profuse hæmorrhage, which he said had occurred more than twenty times since the injury, lasting for a while and then ceasing spontaneously, About the fifth day after his admission, when he said it bled for the twenty-ninth time, it suddenly burst out bleeding, a large stream of arterial blood spurting out from the wound. The tourniquet was placed on the arm, and as I was fortunately in the hospital at the time, chloroform was administered and I proceeded to carry out my plan of action. Passing a probe along what appeared to be only a sinus, I felt something which seemed to be like a piece of loose dead bone; still further enlarging the opening, I could feel it plainly, and once more increasing the size of the wound I proceeded to draw it out with a pair of necrosis forceps, when to my astonishment it turned out to be, not a portion of bone, but a large piece of the breech of the gun-barrel, nearly three inches in length and three quarters of an inch in width, and forming very nearly one quarter of the circumference of the barrel. This being removed, it was found that underneath it there was an opening in the anterior interosseous artery, upon which one end of the piece of iron had rested, its concave surface fitting round the shaft of the ulna, compressing the artery. This seemed to have acted as a valve, and each time the limb was moved in one particular direction the artery was released from pressure and the blood escaped, then by some other change of place it compressed the vessel and stopped the bleeding. In this way only can I account for the very unusual condition that the wound should have so nearly healed, and that the man should have experienced such a number of separate attacks of bleeding as I have described. The artery was now divided transversely, the ends tied with catgut ligature, and the wound treated with strips of lint dipped in a solution of tannin, and in less than four weeks from the date of the operation the patient was discharged perfectly cured. In another case, in which a man was shot in the upper part of the thigh by a bullet, which passed through the limb and escaped at the posterior part, almost at right angles to its axis, the only treatment which was employed, and with complete success, was to pour into the wound the carbolated oil so as to fill the track of it and exclude

the air. In a few days a very favorable action was observable, and in little more than three weeks the wound was healed.

These injuries by pistols and guns have illustrated the fact that persons are very apt to become careless in the use of fire-arms, and that a very large number of such accidents are entirely preventible. In one case, a man who was fatally injured by the explosion of a gun explained to me, on his admission to the hospital and while quite conscious, that he was out shooting small birds, and in order that the birds might not become alarmed by the sight of the gun he placed it muzzle downwards deeply in a very long pocket in the flap of his coat, so that the trigger even was within the pocket. He walked along with it in this careless manner, and when attempting to pull it out of the pocket the trigger caught in the lining, the gun went off, and the contents were lodged in his leg and foot, from the effects of which he died in a few hours after his admission, and before amputation could be performed.

I have included in this sub-class scalds and burns, and in the totals annexed I have drawn a distinction between these two classes of injuries, for it will be found that scalds are for the most part less dangerous and less serious than burns. In scalds it will generally be observed that the difference in the effect of water, when free from greasy matter or oil, and steam, is very considerable. When any portion of the surface of the body is exposed to steam escaping from some aperture, or possibly set free by explosion, and losing its temperature with great rapidity, then the scalds will be, in many cases, more extensive than severe. Accidents from boiling water, particularly where there has been immersion, are next in intensity, while the same fluid containing grease, or being of a high specific gravity, as coffee with milk and sugar in it, and likely to rest some time upon the surface, produces a deeper injury, more intense in its effects and approaching more nearly in its nature the characters of a burn. In burns, also, the particular way in which the injury has been received has to be noted. A very large number of those cases which I have treated have occurred in little children, by the clothes catching fire, or from falling upon the fire; a few, in adults, by

explosions of gas, as in coal mines and gas works, or the most intense forms of burning, where some portion of the body has come in contact with molten lead, zinc, or iron.

Table III.

Class I.—B. Wounds.—*f.* 1. Scalds.

Causes.	Under 1 year.		Under 5 years.		Under 10 years.		Under 20 years.		Over 20 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
Hot water, coffee, tea, &c.	...	...	5	1	1	1	2	...	2	...	10	2
	...	...	...	...	...	...	...	...	...	...	...	...
Boiling water	...	...	2	...	...	...	2	1	..	...	4	1
	...	...	...	...	...	...	...	...	...	...	...	...
Steam	...	...	...	...	...	...	1	...	2	...	3	...
	...	...	...	...	...	...	...	...	1	1	1	1 ...
Hot water with grease	...	...	2	...	...	...	1	...	...	...	3	...
	...	...	...	...	...	...	...	...	...	...	...	...
	...	...	7	2 1	1	1	4	2 1	4	...	16	4 3
	...	...	...	...	...	...	...	...	1	1 ...	1	1 ...
											17	5 3
											25	

2. Burns.

Clothes catching fire	...	...	3	4 3	1	2	6	1	...	1	2	...	1	5	4	11 4
	...	...	...	...	...	...	...	...	...	...	...	...	1	...		1
Falling on fire	...	...	1	1	1	1	1	1	...	...	...	1	1	2	1	2 1
	...	...	...	...	...	...	...	...	...	...	1	1	1	1		1
Flame from candle	...	...	...	...	...	2	...	...	...	...	...	...	...	...	2	
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
Explosion of gas	...	...	...	...	...	...	...	...	...	...	3	1	...	3	1	...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Molten metal	...	...	...	...	...	...	1	...	2		...			3		...
	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
	...	...	4	4 3	2	2 1	9	1 2	...	1	2	5	1 2	13	6	15 5
	...	...	...	...	...	...	...	...	...	1		1	2	1		2
														14	6	15 7
														42		

As to the method of treatment adopted in these cases, although, after the first shock of the accident, the prognosis, all things considered, is more favorable in the scald than in the burn, the application has been the same in both; namely, a material now pretty generally known in the hospital by the name of the "burn ointment." I have found it of the greatest possible service. For

its exact composition I am indebted to Mr. Hoare, a surgeon, who has had great experience of burns produced by the explosion of gunpowder in the large works for the manufacture of that article at Faversham and Dartford, in Kent. I subjoin the formula for the preparation of it—

Ceratum Resinæ Acidum.

℞ Resinæ flavæ, ʒiv (in winter, ʒx).
Ceræ flavæ,
Olei Olivæ, āā ʒxx (in winter, ʒxxx).
Terebinth. Chiæ, ʒviij.
Picis Burgund., ʒiv.
Zinci Oxidi, ʒiv.
Solut. Acid. Carbolici,* fʒiss.
Misce, fiat unguentum.

We now call it *Ceratum Resinæ Acidum*, and take care always to have a quantity in the wards ready for immediate use spread on large pieces of lint, in the manner of a plaster, and kept in a closed flat tin box to protect it from the air. Immediately on the admission of any case of scald or burn into the infirmary, as soon as the clothes have been carefully removed, so as to disturb the injured surfaces as little as possible, they are covered with broad strips of this lint plaster, and, although the little patients generally cry out very lustily at the moment of its application, as if it caused a certain burning sensation, it is wonderful to note how quickly this ceases, and a condition characterised by absence of pain ensues. It would almost seem as if the carbolic acid which it contains, and perhaps, also, the resinous terebinthinated substances in it, acted as local anæsthetics to the cutaneous nerves, for we constantly find children treated with this ointment pass very shortly into a state of repose, and sleep without the use of any opiates. Having occasionally been in the ward at the moment when a burn case was admitted, and watched the whole process of dressing

* *Solutio Acid. Carbolici.*

℞ Acid. Carbolici puri
(Calvert's Crystals, melted), fʒxvj.
Glycerinæ puræ, fʒviij.
Aquæ destillatæ, fʒviij.
Misce, fiat solutio.

here described, I can personally bear testimony to the tranquillising effects thus produced. There is, moreover, this great advantage in the use of this preparation, that it preserves the excretions of the part, which will continue unchanged from local putrefaction throughout the whole treatment of the case; and I have repeatedly seen scalds aud burns of very large extent treated in this way from first to last, during many weeks, and the dressings only removed each second or third day, without the slightest offensive odour or unpleasant discharge. This ointment, however, is somewhat tedious to make, and cannot be easily ordered in the hurry of ordinary prescriptions, but a very good substitute for it, although not quite equal in its properties, can be quickly made in the following way:—Carbolic acid, 20 drops; oxide of zinc, one drachm; rub these together, and add one ounce of resin cerate, the whole being mixed while cold, so as not to volatilize the acid. This is an excellent dressing for bed-sores and sluggish ulcers which excrete a fetid discharge.

We next come to the cases of amputation which have occurred during this period. They are in all 61; 30 for accident, and 31 for disease, and they are shown in the annexed tables, from which it will be seen, that out of the entire number there have been seven deaths in the cases for accident and nine in those for disease, taken at all ages and in all degrees of severity.

Table IV.

Class I.—C. Amputations.—*a*. Accidents.

No.	Initials.	Age.	Sex.	Part.	Side.	Nature of operation.	Result.	Days in hospital aft. operation.	Cause.
1	P. F.	15	M.	Shoulder-joint	R.	Flaps	Rec.	52	Machinery.
6	W. F.	16	M.	Low. 3rd arm	L.	Circular	Rec.	39	Machinery.
	H. K.	30	M.	Near shoulder	R.	Flaps	Rec.	37	Crane fell.
	M. M.	16	F.	Mid-arm	R.	Flaps	Died	16 hrs.	Gunpowder.
	W. R.	12	M.	Mid-arm	L.	Circular	Rec.	26	Machinery.
	W. R.	9	M	Low. 3rd arm	L.	Circular	Rec.	33	Railway.
	T. S.	53	M.	Arm	L.	Flaps	Died	40	Machinery, alb in U.
6	J. B.	42	M.	Mid-forearm	L.	Flaps	Rec.	40	Machinery.
	W. H. B.	22	M.	Low.3rd forearm	L.	Flaps	Rec.	31	Cog-wheels.
	W. C.	48	M.	Low.3rd forearm	R.	Flaps	Rec.	49	Machinery.
	W. E.	18	M.	Low.3rd forearm	L.	Flaps	Rec.	90	Rollers.
	W. F.	38	M.	Mid-forearm	R.	Flaps	Rec.	29	Cog-wheels.
	F. G.	32	M.	Low.3rd forearm	L.	Flaps	Died	8	Machinery.
6	E. D.	13	M.	Partial, hand	L.	Flaps	Rec.	60	Cog-wheels.
	W. H.	29	M.	Partial, hand	L.	Flaps	Rec.	9	Gunshot.
	A. H.	22	M.	Partial, hand	R.	Flaps	Rec.	12	Circ. saw.
	T. M.	14	M.	Partial, hand	R.	Flaps	Rec.	35	Crush.
	M. M.	44	M.	Thumb	R.	Circular	Rec.	19	Cog-wheels.
	E. S.	16	M.	Partial, hand	R.	Flaps	Rec.	13	Machinery.
1	B. T.	14	M.	Hip-joint	L.	Flaps	Died	8 hrs.	Railway.
6	T. B.	60	M.	Upp. 3rd thigh	R.	Circular	Died	6 hrs.	Railway, syncope.
	C. F.	23	M.	Upp. 3rd thigh	L.	Flaps and circular	Rec.	41	Comp. fract. thigh.
	H. G.	24	M.	Upp. 3rd thigh	L.	Circular	Died	1 hour	Railway.
	J. H. G.	21	M.	Upp. 3rd thigh	R.	Flaps and circular	Rec.	43	Machinery.
	T. J.	14	M.	Upp. 3rd thigh	L.	Circular	Rec.	113	Railway.
	W. S.	61	M.	Mid-thigh	R.	Flaps and circular	Rec.	78	Crush.
3	E. D.	13	M.	Upp. 3rd leg	R.	Flaps (Fergusson)	Rec.	81	Machinery.
	J. L.	38	M.	Upp. 3rd leg	R.	Flaps (Fergusson)	Rec.	52	Crushed foot and leg.
	S. M.	28	M.	Mid-leg	L.	Flaps (Fergusson)	Died	51	Railway.
1	J. C.	51	M.	Partial, foot	R.	Flaps	Rec.	52	Railway.
30 cases.									

TABLE V.

CLASS I.—C. Amputations.—*b.* Disease.

No.	Initials.	Age.	Sex.	Part.	Side.	Nature of operation.	Result.	Days in hospital aft. operation.	Disease.
1	F. G.	19	M.	Mid-arm	R.	Circular	Died	5	Elbow.
3	W. B.	45	M.	Up. 3rd fore-arm	R.	Circular	Rec.	22	Epithelioma, shoulder-joint afterwards.
	T. E.	15	M.	Forearm	R.	Flaps	Rec.	31	Re-amputation.
	E. N.	39	F.	Low. 3rd fore-arm	L.	Teale	Rec.	20	Carpus.
2	J. B.	19	M.	Hip-joint	L.	—	Rec.	62	Tumour, thigh.
	S. E.	17	M.	Hip-joint	L.	—	Rec.	57	Tumour, thigh.
14	J. C.	22	M.	Up. 3rd thigh	R.	Flaps	Rec.	65	Re-amputation.
	T. D.	51	M.	Mid-thigh	L.	Circular	Rec.	50	Epithelioma, leg.
	J. D.	32	M.	Mid-thigh	R.	Flaps and circular	Died	6	Knee.
	G. E.	54	M.	Thigh	L.	Carden	Died	7	Knee.
	A. G.	36	F.	Low. 3rd thigh	R.	Circular	Rec.	113	Knee.
	J. G.	21	M.	Mid-thigh	R.	Circular	Rec.	40	Knee.
	G. H.	35	M.	Up. 3rd thigh	L.	Circular	Died	2	Acute gangrene.
	C. J.	24	M.	Mid-thigh	R.	Circular	Died	20	Knee, large abscess.
	E. L.	18	F.	Thigh	L.	Carden	Rec.	43	Tumour, leg.
	T. M.	51	M.	Mid-thigh	L.	Circular	Died	10	Tumour, knee.
	J. S.	32	M.	Mid-thigh	L.	Circular	Rec.	43	Knee.
	J. T.	22	F.	Thigh	R.	Carden	Died	22	Old ulcers, alb. in U.
	M.A.T.	11	F.	Mid-thigh	R.	Teale	Rec.	64	Knee.
	C. W.	36	M.	Thigh	R.	Carden	Rec.	142	Epithelioma, leg.
6	A. B.	36	F.	Up. 3rd leg	L.	Teale	Rec.	69	Ankle.
	J. B.	43	M.	Low. 3rd leg	L.	Circular	Died	17	Ankle.
	G. C.	40	M.	Up. 3rd leg	L.	Flaps (Fergusson)	Rec.	39	Old ulcers.
	J. D.	71	M.	Up. 3rd leg	R.	Circular	Died	10	Tibia and atheroma.
	E. L.	26	F.	Low. 3rd leg	L.	Teale	Rec.	53	Tarsus.
	T. T.	37	M.	Mid-leg	L.	Flaps (Fergusson)	Rec.	78	Old ulcers.
5	H. D.	42	M.	Ankle	L.	Syme	Rec.	37	Tarsus.
	C. H.	15	M.	Ankle	R.	Syme	Rec.	119	Tarsus.
	M. M.	22	F.	Ankle	L.	Syme	Rec.	60	Tarsus.
	J. T.	12	M.	Ankle	R.	Syme	Rec.	36	Tarsus.
	S. W.	33	F.	Ankle	R.	Syme	Rec.	57	Tarsus.

31 cases.

TABLE VI.

Cases of Death after Amputation—For Accident.

Part.	Initials.	Age.	Sex.	Time after operation.	Probable cause.
Arm	M. M.	16	F.	16 hours	Shock.
Arm	T. S.	53	M.	40 days	Old albuminuria.
Forearm	F. G.	32	M.	8 „	Acute pleurisy, with effusion.
Hip-joint	B. T.	14	M.	8 hours	Shock.
Thigh	T. B.	60	M.	4 „	Shock, syncope.
Thigh	H. G.	24	M.	1 hour	Shock.
Leg	S. M.	28	M.	51 days	Large abscesses from contusions.
				For Disease.	
Arm	F. G.	19	M.	5 days	Hæmorrhage and exhaustion after very old disease of elbow.
Thigh	J. D.	32	M.	6 „	Secondary hæmorrhage.
Thigh	G. E.	54	M.	7 „	Exhaustion, syncope.
Thigh	G. H.	35	M.	2 „	Acute gangrene.
Thigh	C. J.	24	M.	20 „	Large abscess and exhaustion.
Thigh	T. M.	51	M.	10 „	Exhaustion after long illness.
Thigh	J. T.	22	F.	22 „	Obscure kidney disease.
Leg	J. B.	43	M.	17 „	Secondary hæmorrhage and exhaustion.
Leg	J. D.	71	M.	10 „	Exhaustion.

When, however, these lists are carefully examined, we may observe that, by eliminating the milder cases, such as amputations of the hand and partial amputations of the foot, the average death-rate will become slightly increased; yet the results of the more serious amputations will bear inspection, for in the returns of amputations of the thigh for accident, which are generally so fatal, making deductions for two out of six cases which died within twelve hours of the operation, the four remaining as recoveries show, under the circumstances, a very good result. In the case of amputation of the hip-joint the death took place within twelve hours after the operation, but in that of amputation of the shoulder-joint the patient recovered. The other cases of accidents also show a good return, and in amputations of the leg one case out of three died fifty-one days after the operation, while the other two recovered. Then, in amputations of the arm, two cases died, one in sixteen hours and one forty days after the operation, but in this latter case the man had been the subject of

chronic albuminuria. Out of six amputations of the forearm there were five recoveries. As stated above, out of thirty-one cases of amputation for disease there were nine deaths. Two cases recovered in amputation at the hip-joint and eight recovered after amputation of the thigh out of fourteen cases. In the leg there were four recoveries out of six cases; and in amputation of the ankle (Syme's operation) all the cases, five in number, recovered.

In all these cases, from the first one, an amputation of the thigh for tumour of tibia close to the knee-joint, which was performed in February, 1867, to the very last, some system of antiseptic treatment was observed. At first the watery solution, then the oil, then the lac plaster of Prof. Lister, then my own cerecloth, next his muslin, and now my present imitation of it—the resin-cloth which I have so recently described; one chief object being steadily kept in view in all these efforts, namely, the more complete avoidance of those putrefactive changes in the excretions of the wounds, occasioned by these operations, to which I have so frequently referred, not only in the pages of these 'Reports,' but in other places.

Those who have endeavoured to carry out these principles alone can tell the numerous complicated circumstances which interfere with their full development. Many of the wounds produced by amputation are apt to close in on the surface, and leave a cavity in the centre, from which, at the very time we are congratulating ourselves on the successful issue of the case, they develope unfavorable action and cease to heal kindly. The greatest care, therefore, is needed in the first adjustment of the surfaces of the amputation flaps, so as to ensure their adhesion throughout the entire depth of such wounds. The drain tube of Prof. Lister is certainly a very valuable means of preventing complications arising from the healing of the surface and the formation of this central cavity. The chief feature of a local nature, as compared with constitutional effects, to be remarked upon as a consequence of the antiseptic dressings of amputation wounds is, that, whatever the particular size or shape of the flaps at the time of the operation, these will be preserved to a degree which is rarely to be met with under any other methods of dressing, for with the

absence of pus there will be an entire freedom from ulceration or sloughing of the edges of the wound, and a corresponding saving of tissue; whereas all surgeons know how constantly it happens that even where, at the time of an amputation, they have left what is called sufficient flap, yet in the subsequent progress of the case, from the sloughing of the edges, the stump becomes conical, and the bone hardly covered. This single fact, apart from all others, is a most valuable one in the surgery of amputations, for we can thus predicate, with something like certainty, that the structures we leave in the operation shall be preserved throughout the treatment. I say nothing of the absence of pain and constitutional irritation which must result when we can secure the patient from the additional risk of abscesses, skin inflammation, and deep absorption of injurious matters, either through the open mouth of veins, or more directly by the lymphatics. It has been at all times a subject of observation to me, and one which I invariably point out to those who watch my *clientelle* in the wards, that, within a very few days after the amputation of a limb treated by antiseptic measures, the stump loses that exquisite sensitiveness which attends upon deeply seated inflammatory changes, and the patient can often bear to be turned over in bed, or allow the stump to be moved to a degree which would astonish those who have been accustomed to find inflammatory changes of extreme intensity, the usual attendants upon the healing processes of large wounds. Ever since Mr. Lister first suggested his antiseptic catgut ligatures for tying arteries, they have been employed in each of the cases here recorded. Previous to this, in some one or two amputations and in some of the wounds from the removal of the breast, I tried the different methods of acupressure designed by the late Prof. Simpson, but with very poor success at the time, and in the after treatment of such cases the patients complained bitterly of the pain produced in the removal of the needles. More recently—perhaps, within the last twelve or eighteen months—I have used a combination of torsion and ligature in my amputations. When torsion fails, or from any cause is not readily applicable, catgut ligatures are resorted to; but, certainly, where the former plan

mixture, have invariably been followed by good results. epitheliomatous ulcerations, as soon as their pseudo- ney has become evident, their prompt removal is imperative. y of the cases which I have seen appear to have begun as cers, to have remained in this condition for many years, in the second stage of their growth suddenly to have malignant action. In varicose ulcers it often happens e skin has been once fairly healed by careful strapping, and the use of well-adapted local pressure, no appli- ill be superior to well-adjusted plaster put on carefully ged at fixed intervals; yet it is found, even in hospital patients request permission to employ elastic stockings like appliances; the great danger in the use of which the pressure is so frequently misdirected and so excessive parts of limb as compared with others, as to perpetuate to correct the faulty dilatation of the veins.

sub-class of the second group contains the cases of Of these, several, as the accompanying Table VIII will ve been reduced by taxis without operation. The other o. IX.) details those cases upon which herniotomy has formed; and here, indeed, is a sad record of what lender, in his valuable paper, has styled "Too late Opera- Hernia;" for, as is here shown, out of the entire of seven deaths after operation, in one case only had the been constricted for so short a period as sixteen hours. was thirty hours, then thirty-three, fifty-six hours, four even in the last case for no less a period than fourteen ceding admission into the hospital had symptoms of lation appeared to exist.

e noted the condition of the fluid in the sac and the state bowel in each of these cases, and the facts (*vide* Table IX) ak for themselves, as showing that as far as their influence general statistics of any hospital, hernia cases, being in elves so *peculiar* from the circumstances to which they are to be exposed before admission, ought not to be included e average of deaths so estimated.

can be carried out it is the most elegant and effective means which we possess of arresting hæmorrhage in surgical operations. As to the number of days during which each of these cases of amputation have remained in hospital from the date of operation to the time of discharge, I do not think the numbers quoted in the table can be taken as of much value. Many of the cases which have come from a distance have stayed in the hospital for a longer period, on this account, than they would have done had they lived in the neighbourhood and been transferred earlier to the accident room, or sooner become out-patients. Again, in comparing together cases of amputation in reference to the exact duration of treatment, we can only go upon very general principles, for there is so much to be said on the influence of constitution and the peculiar circumstances of the accident that, it is impossible to define, with anything like precision, the time required for the healing of any given case. And, even in the statistics of recovery, it will often be found that surgeons differ very much in their estimate of what is termed healing of the stump. Some say that the stump may be reported as being healed so soon as the wound has become nearly superficial; others require that before the healing process shall be pronounced complete perfect cicatrization and covering in by cuticle shall have been accomplished. I think, if the statistics of some hospitals were carefully looked into, many cases said to be healed would not be found absolutely cicatrized in the latter sense, but in the returns which are given in these tables, it may be assumed that every case, when allowed to go out of hospital after amputation, had the wound so nearly healed that probably not much more than half a square inch of granulating unhealed surface still remained. Occasionally, of course, an amputation wound will be delayed in its cicatrization by the presence of a small sinus, through which at last a fragment of dead bone is expelled, and the cure is then completed.

The last division in this class is for ulcers (Table VII), and respecting these I have not much to report. I have found, what has been often observed, that cases of ulcers taken into the wards of a hospital, invariably improve in appearance, soon after their admission.

Table VII.

Class I.—D. Ulcers.

Nature of Ulcer, &c.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F	M.	F.	M.	F.	M.	F.
a. Simple.....	...	...	2	1	1	2	2	...	...	...	5	3
b. Indolent	...	...	1	1	3	6	3	10	2	...	9	17
c. Varicose	...	...	...	1	1	3	1	3	1	1	3	8
d. Eczematous	...	1	1	...	...	1	...	1	1	...	2	3
e. Syphilitic	...	...	...	2	5	8	4	3	...	...	9	13
f. Epithelioma	...	...	...	...	1	1	4	2	2	...	7	3
	...	1	4	5	11	21	14	19	6	1	35	47
											82	

As to special methods of treatment, if the ulcer was not due to constitutional cachexia, the treatment consisted mainly in rest and cleanliness, the latter result being secured by some of those antiseptic applications which I have already named, chiefly in the form of watery solution. For indolent ulcers, which form a large proportion of this class, I have tried, by means of radiating incisions on their edges, and by cuts made parallel to their margins, to release the tension of the skin; elevation of the whole limb on an inclined plane; Baynton's plan of plaster and bandage; Higginbottom's system, with a very strong solution of nitrate of silver; Prof. Syme's plan of blistering; and pressure applied with a tin-plate covering for the wound and strips of plaster and bandage to the surrounding tissue. All these methods and some others, have served their purpose according to circumstances, there not being any one special system which I could speak of as having been applied exclusively to every case. In all the ulcers, as often as could be managed and as soon as the granulations had risen to the level of the skin, some system of transplantation was practised; and in some instances the changes so set up advanced with marvellous rapidity. It almost seemed as if the

formation of a little island of healthy skin in the centre of a sea of granulations induced a more rapid nutritive change in them at the border of the ulcer, so that we always noted, where a case of skin grafting was successful, that the size of the ulcer diminished principally by an in-growth of its edges. As to the permanence of cure in these cases of transplantation I cannot say much; for, on several occasions, after the ulcers had healed and remained so for a few weeks, the patient returning to his usual occupation with a depending position of the limb, soon had to make fresh application at the hospital for readmission with renewed or even fresh ulcerations. In contrasting the syphilitic ulcers with those of the strumous type, I have observed that, while the true strumous ulcer sometimes presents a sharp cut edge, something like the syphilitic, dependent, perhaps, in each case on a low vital condition, the strumous ulceration generally burrows at its edges some distance beneath the skin, which assumes a cold congested appearance, while the syphilitic does not. These strumous cases are those which seem to do best by the removal all this loose skin and trimming of the margin of the ulcer with curved scissors, which sets up fresh action and stimulates the growth of new tissue. There are, of course, cases in which we have a combination of these two conditions, the syphilitic taint and strumous habit, producing a strumo-syphilitic ulceration. Here we may probably find the ulcer in the usual situation at the back of the leg with the form either of a true circle or a crescentic outline, the edges at one part sharp and defined; and at another undermined or burrowing. Such cases require a double method of treatment, attention to the general constitutional powers, and specific treatment combined. Here we are sure to observe benefit in the use of the iodide of iron or of potassium, and, at the same time, the application of some mercurial preparation to the sore itself, as the black wash or the red ointment. In ulcerations complicated with eczema, as soon as their true nature has been detected by observing the surrounding irritation of the skin and the vesicular character of the eruption, soothing local applications and, internally, the administration of arsenic with iron, after Mr. Erasmus Wilson's valuable form for the *ferro-*

arsenical mixture, have invariably been followed by good results. For the epitheliomatous ulcerations, as soon as their pseudo-malignancy has become evident, their prompt removal is imperative. But many of the cases which I have seen appear to have begun as simple ulcers, to have remained in this condition for many years, and then in the second stage of their growth suddenly to have developed malignant action. In varicose ulcers it often happens where the skin has been once fairly healed by careful strapping, bandaging, and the use of well-adapted local pressure, no application will be superior to well-adjusted plaster put on carefully and changed at fixed intervals; yet it is found, even in hospital practice, patients request permission to employ elastic stockings and suchlike appliances; the great danger in the use of which is, that the pressure is so frequently misdirected and so excessive in certain parts of limb as compared with others, as to perpetuate rather than to correct the faulty dilatation of the veins.

The first sub-class of the second group contains the cases of Hernia. Of these, several, as the accompanying Table VIII will show, have been reduced by taxis without operation. The other table (No. IX) details those cases upon which herniotomy has been performed; and here, indeed, is a sad record of what Mr. Callender, in his valuable paper, has styled "Too late Operations for Hernia;" for, as is here shown, out of the entire number of seven deaths after operation, in one case only had the bowel been constricted for so short a period as sixteen hours. The next was thirty hours, then thirty-three, fifty-six hours, four days, and even in the last case for no less a period than fourteen days preceding admission into the hospital had symptoms of strangulation appeared to exist.

I have noted the condition of the fluid in the sac and the state of the bowel in each of these cases, and the facts (*vide* Table IX) will speak for themselves, as showing that as far as their influence on the general statistics of any hospital, hernia cases, being in themselves so peculiar from the circumstances to which they are liable to be exposed before admission, ought not to be included in the average of deaths so estimated.

TABLE VIII.

CLASS II.—A. Herniæ.

Not operated on, or reduced by taxis.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Umbilical							1				1	
b. Inguinal. R.	1		2		2	2	1		1		7	2
„ L.					1	1	4				5	1
c. Femoral. R.						1						1
	1		2		3	4	5	1	1		12	14
											17	
Operations for—												
a. Inguinal. R.							1		2		2	1
„ L.								1				1
b. Femoral. R.										2		2
„ L.							1			1	1	1
							2	1	2	3	2	4
											8	

TABLE IX.

Herniæ.—Fatal cases.

	Initials.	Sex.	Bowel strangulated before operation.	Sac contained—
Femoral	S. B.	F.	16 hours	Tight stricture; bowel spotted by ecchymosis.
Inguinal	M. J.	F.	30 hours	Fluid dark; bowel congested; many adhesions; great tympanitis.
Femoral	M. C.	F.	33 hours	Tight stricture; bowel with one white patch.
Inguinal	W. H.	M.	56 hours	Fluid very dark and with omentum emphysematous; bowels purple-coloured.
Femoral	M. B.	F.	4 days	Serum fœtid and dark; bowel nearly black.
Femoral	...	M.	14 days	Bowel found burst in the sac and compressed.

Two of the cases here recorded were of special interest, one being a case of umbilical hernia in a man, which had been strangulated five days before admission, and when the patient came into the hospital collapse had already commenced, and he died in a very few hours without the possibility of entertaining the idea of operative interference.

The other case was that of a man on whom I operated on two occasions for the same inguinal hernia. The first time was after a strangulation of thirty-one hours, on the 21st of March, 1869. He recovered, was made an out-patient on the 14th of April, and, strange to say, according to my notes, on the 21st of March, 1871, just exactly two years from the previous attack, he again presented himself with a strangulated hernia on the same side, which had existed since the 19th of the month, rather more than forty-eight hours. The symptoms were very slight, being chiefly indicated by hiccup and constipation, but no vomiting of any note, and it was not until the morning of the 24th that I felt justified in repeating the operation. I found some difficulty in reducing the bowel on account of adhesions which had formed at the posterior part of the sac, but these were overcome, and although very congested, but not to a dangerous degree, it was reduced; and the man made a speedy recovery, leaving the hospital on the 26th of April.

This case will serve to illustrate the possible advantages which would occur if persons the subject of hernia were less indisposed to submit to early operations. Even this case was somewhat delayed on the second occasion at the request of the patient, but having experienced the benefit of the first operation he very soon willingly consented to the second.

Among the cases of tumour, Class II B, Table X, which I have to report, a very large proportion have been examples of the fatty tumour, and hardly need any special remark except that in the management of the wounds resulting from the removal of such tumours we often find that since no skin is taken away at the time, the wound which is made extends for some distance beneath the cutaneous tissues, and I have here observed the great advantage gained by the use of an india-rubber drainage tube according

Table X.

Class II.—B. Tumours.

Character of Tumour.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Fatty						4	1	1			1	5
b. Fibrous				1				1				2
c. Cystic			2					1			2	1
d. Glandular						1	1				1	1
e. Myeloid							1				1	
f. Malignant					1	1		3	2		3	3 1
			2	1	1	5 1	3	6	2		8	12 1
											21	

to Mr. Lister's suggestions. Unless this is done, in spite of pressure and other means which may be taken to prevent the accumulation of blood and other secretions from the surface of the large cavity thus occasioned, much disturbance of the parts must necessarily result and delay the union of the wound; but, by the use of a tube with the usual antiseptic precautions a wound of this nature, however extensive, may be healed very readily and with little, if any, suppuration. I had one case in which an immense tumour was removed from the thigh of a woman aged about forty. It was situated on the back of the right thigh, which measured over the tumour thirty-two inches in circumference for the extent of seventeen inches. It was said to have occupied in its growth eighteen months. The incisions required were very extensive, but fortunately the tumour was easily removed, and except for its appearance when cut, and the fact that there had been a sprouting fungus on the surface, it might have been regarded as a tumour of innocent nature. A microscopic examination of the sections of it showed too clearly the presence of double nucleated malignant cells. She went on favorably for about three weeks, and

the wound had nearly healed when her constitutional powers gave way; great debility ensued, and she sank rapidly as if from general exhaustion. A *post-mortem* examination showed that all the viscera were healthy except the kidneys, which were congested and in the first stage of fatty degeneration; both lungs were in an advanced stage of grey hepatisation, and the glands in the lumbar region of the abdomen were considerably enlarged. There was also a case of tumour of the antrum on the left side in a man, aged fifty-eight, on whom I performed the operation of removing the upper jaw. This I did by Sir W. Fergusson's single central incision into the nostril, turning up the flap of the cheek so as to get a good view of anterior surface of the superior maxillary bone, and then making the usual incisions to open the antrum. On this being done with very little force, a large myeloid tumour was easily detached which seemed to be so little connected to the surrounding tissues that it fell out on to the floor at the moment of the operation. Other portions of bone were removed, the whole of the surface was sponged over with a strong solution of chloride of zinc, and the wound closed in the usual way. It healed very quickly, so that within five weeks from the date of the operation he went out, and all seemed to have done well; but, sad to tell, within three months a very rapid growth commenced in the upper part of the mouth, which soon assumed a positively malignant aspect, and, I believe, in a few months terminated his life. The point of interest in this case has always seemed to me to be the loose attachment of the tumour to the interior of the antrum, contrary to what might have been expected in malignant disease. There did not seem to be at the time of the operation any of that infiltration of tissue by malignant growth which is often observed, and I remember how I congratulated myself at the conclusion of the operation that this was possibly a tumour not malignant in its nature, yet the further progress of the case showed how fallacious it was to found such a conclusion upon such evidence. The only other case of tumour of any special interest was that of a young man, aged twenty, from whom I removed a large cystic tumour by operation. It had existed for more than two years, and had been seen by several surgeons, who had declared that its removal

would be attended with considerable danger, thinking, no doubt, that it was of a cancerous nature. It was about six inches in length and five in breadth, and situated on the external side of the left elbow. It had a slightly elastic fluctuating feel, which gave the idea of a fluid covered over by dense structures. Having determined to remove it I first tapped it with an exploring trochar and canula, and from the upper part let out eight ounces of dark-coloured fluid, and when this ceased to flow about two ounces of a pale straw-coloured fluid were drawn from the lower part, showing that it was polycystic in its structure. I then proceeded with the operation, which did not present any special difficulties except those arising from troublesome hæmorrhage from many small arteries, and by careful dissection, without injuring the large nerves near the external side of the elbow, the whole mass was completely removed. The large wound thus left was treated as closely as possible on Mr. Lister's principles, and ultimately healed very well. I heard of the patient some months afterwards, and up to that time there had been no returning symptoms of the disease, but it was perhaps too soon to found any conclusions upon it, yet the cystic nature of the tumour might exclude it from the list of malignant diseases.

Next to tumours I have placed abscesses (Class II, C), because it is well known in practice that many cases of cold or slowly-formed abscesses have been mistaken for tumours, almost up to the moment of an operation; so that the late Mr. Skey used to say no tumour should be removed until the operator, just before commencing his incisions, had proved, by inserting a scalpel, that he was not dealing with a chronic abscess. In every case of abscess which I have opened I have endeavoured to follow out the principles so strongly insisted upon by Mr. Lister, and have greatly profited by acting minutely in accordance with the instructions he has given for the conduct of these cases. One instance of abscess in the thigh, which I attempted to treat in this way, was tapped with the trochar and canula in place of opening it with the scalpel. The fluid it contained flowed out freely, but just at the end of the operation, in removing the canula, some air was drawn into the abscess. This occurred in the early

Table XI.

Class II.—C. Abscesses.

Seat of Abscess.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Head, neck, or chest	...	...	...	1	...	...	2	...	...	...	2	1
b. Shoulder	...	...	...	...	1	...	..	...	...	...	1	...
c. Arm	...	...	1	...	1	...	...	...	...	1	2	1
d. Forearm	...	...	...	...	1	...	1	...	...	...	2	...
e. Hand	...	...	...	...	1	...	...	...	...	...	1	...
f. Lumbar	...	...	...	1	1	...	...	...	...	...	1	1
g. Psoas iliac	1	...	1	1	1	1	...	...	...	...	3	2
h. Inguinal and pelvic	...	...	1	...	...	1	...	2	...	...	1	3
i. Buttocks and hip...	1	...	...	1	5	...	...	...	...	...	6	1
k. Thigh	3	...	4	1	1	...	...	...	...	...	8	1
l. Leg	...	...	...	...	...	1	...	...	1	...	1	1
m. Foot	...	...	...	...	...	...	...	...	1	...	1	...
	5	...	7	5	12	3	3	2	2	1	29	11
											40	

stages of our practice when we used to cover such wounds with the oiled lint curtain. The bubble of air, no doubt, carried some irritating matter into the nearly emptied sac, and this abscess gave me more trouble in its after treatment, and produced more constitutional irritation, than any other which I have had to treat. All the more recent ones have been opened in a spray or atmosphere of antiseptic vapour, and now we open a large abscess on Mr. Lister's principle with the greatest confidence, and a firm conviction that the operation will be followed by the minimum amount of constitutional disturbance. The after-treatment in nearly every case will be tedious if we seek to obliterate the large sac of an abscess, which may have held a pint, or even a pint and a quarter, of fluid matter. For, assuming that we get no secondary suppuration, which is, indeed, what we seek to avoid by the Lister method, yet it must take some considerable time for the secreting membrane to become adherent on all sides of the sac, so that, as in the case of

a large wound, time must be allowed for its complete and permanent closure, and if, by chance, the special processes of treatment are interrupted, even for a short time, re-secretion of pus will occur and possibly lead to chronic action, terminating in one of those troublesome sinuses which used so frequently to be the sequel to large abscesses. One abscess which I had to treat was situated in the cellular tissue, around and behind the cæcum, in a woman, aged forty-three years. A small aperture, consequent upon the spontaneous bursting of the abscess, had existed for a long time, and gave me considerable trouble; I can hardly say that any material benefit had accrued even after some months' treatment. But in this case I had an illustration of the dangers which may occur from the indiscriminate use of carbolic acid; for, in the treatment, the first thing I did was to enlarge the opening which nature had formed for the exit of matter, and thinking I might possibly arrest the further secretion of it and diminish its putrid character by the application of strong carbolic acid, I injected, by means of a syringe with a small long nozzle, about a drachm of the nearly pure acid mixed with just enough water to keep it liquid. I had hardly done this when the woman suddenly turned deadly pale, the pulse seemed almost to cease at the wrists, and it appeared as if she was in imminent danger of instant death; this lasted only for a few moments until we could get brandy and other stimulants for her relief, and although she remained in a very exhausted and faint condition for many hours afterwards, fortunately no worse results followed. I have seen very similar symptoms occur from the use of a solution of carbolic acid to the head in the case of a gentleman suffering from some disease of the scalp, with alopecia, for whom it had been prescribed; and also in a child, where it was applied mixed with oil, to a large burn, so there can be no doubt that if we employ carbolic acid as an external application without due care as to its strength it may have a most depressing and even dangerous effect upon the general circulation. The presence of melanuria, which I early observed in patients treated by this same remedy for external wounds of almost any description, shows that nature does her best to expel from the system a drug which, under some circum-

stances, must be looked upon as an irritant poison. We rarely see these symptoms of black urine in cases now treated; inasmuch as the strength of the preparations we employ at present is infinitely less than formerly. I had an interesting case of what seemed to be an external abscess, extending beneath the mammary glands, on the side of the chest of a young woman, aged twenty-eight years; here there were two sinuses which had discharged matter for a considerable time previous to her admission into the hospital. Although there were no external signs of her condition, a careful examination showed that for many months she had been the unconscious subject of empyema on that side which had burst spontaneously in this insidious manner. The whole of the left side of the chest was found to be disorganised from old neglected pleurisy, and at the suggestion of Dr. Morgan, who saw the case with me, a counter opening was made at the posterior and lateral part of the chest, into which a spiral wire drain-tube was inserted through which the matter flowed freely, and the sinuses in front quickly healed. This patient was for many months under observation, and appeared to go on favorably. She was twice admitted into the hospital, but, after having been in the second time for some weeks, she was attacked with symptoms of pleurisy of the right, if not also a renewed condition of the left side, with intense dyspnœa, from the effects of which she died very suddenly, and, unfortunately, no post-mortem examination was permitted.

Class III.—A. *Diseases of Bone.*

I have not much to remark upon in this division of my subject. I do not draw any practical distinction as a point of diagnosis between caries and necrosis, although willing to admit that such difference does exist. I take the definition that caries is "molecular death," and necrosis "molar death" of osseous tissue. On referring to Table XII it will be seen that the cases are pretty equally distributed over all ages and in all bones, but that in regard to sex the male has the preponderance, and as to particular

Table XII.

Class III.—A. Diseases of Bone.

Parts.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
1. Cranium	...	...	1	...	2	...	1	...	...	...	4	...
2. Face	2	...	1	...	...	1	3	1	...	...	6	2
3. Scapula	...	...	...	...	1	1	...	...	...	...	1	1
4. Humerus	1	1	...	...	1	...	...	...	...	...	2	1
5. Ulna	1	...	2	...	...	...	...	...	...	...	3	...
6. Radius	...	1	1	...	...	...	...	...	...	...	1	1
7. Hand	...	1	...	...	...	...	...	...	...	...	...	1
8. Vertebræ	...	...	...	...	1	...	...	...	...	...	1	...
9. Femur	...	...	1	...	2	...	...	...	...	...	3	...
10. Tibia	5	...	2	3	6	2	1	...	...	...	14	5
11. Fibula	...	...	1	...	...	...	...	...	...	...	1	...
12. Foot	...	...	3	...	3	1	1	...	...	1	7	2
	9	3	12	3	16	5	6	1	...	1	43	13
											56	

Table XIII.

Class III.—B. Diseases of Joints.

Joints.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Sterno-chondral	...	...	...	...	1	...	...	...	...	...	1	...
b. Elbow	2	1	1	1	1	1	...	...	1	...	5	3
c. Wrist	...	...	1	...	...	...	...	...	...	...	1	...
d. Hip	8	4	6	2	...	4	1	...	...	...	15	10
e. Knee	1	...	6	4	8	6	3	...	...	...	18	10
f. Ankle	1	...	2	1	1	...	...	...	...	...	4	1
g. Foot	...	...	...	...	...	1	...	...	...	1	...	2
	12	5	16	8	11	12	4	...	1	1	44	26
											70	

bones the tibia is the one in which necrosis is most frequently found. Caries, I need not say, was the prevailing disease in the bones of the tarsus and in the foot generally.

In diseases of joints (Sub-class B, Table XIII) those of the knee and hip afforded the greatest number of cases, and next in order the elbow and the ankle. Yet it must not be forgotten that affections of other articulations are frequently treated as out-patients of the hospital, and therefore do not enter into these estimates of our hospital statistics. In affections of the hip and knee, perfect rest, as far as possible, or the "physiological rest" of Hilton, seems to be the essential condition of treatment. All the cases of hip-joint disease have been treated by the weight-extension plan, although some have been managed for a time by the long splint only; yet this acts much less favorably than the weight, particularly while the patient is sitting up in bed; for unless the bandage which confines the upper part of the splint to the side of the chest be painfully tight, a very evident movement of the hip-joint itself, is permitted. I have, therefore, given up the use of the long splint in hip-joint disease, and now invariably adopt the weight plan of extension. In some cases of subacute disease of the knee, I have also found the weight of great service, not only in preventing a permanent flexion of the joint, but likewise in checking those spasmodic contractions of the muscles, by which the tender and inflamed surfaces of the cartilages are brought into painful contact.

The late Mr. Holmes Coote recommended that, in chronic joint affections, we should always secure an extra amount of warmth for the part affected, urging that we had, by this means, a better chance of preserving its vital powers, and securing more energetic reparative changes; for it is notorious that most of these cases occur in persons whose constitutional powers are feeble. Hence, by the external application of warmth and moisture, by means of wetted lint, with the addition of opium, we secure a diminution of tension of the tissues surrounding the joint, and the abnormal sensitiveness of the parts. The simple method of enclosing a diseased joint, especially in its acute stage, in such a dressing as the above, and continuing the use of it until the skin becomes

well corrugated and wrinkled (having the appearance of a washer-woman's fingers when well sodden in water), will, in a large majority of cases, be followed by the best results, both as regards temporary relief from pain and permanent benefit to the patient. It is curious, in some cases of acute inflammation of joints, to note how difficult it is to produce this particular condition of the skin, for the vascular action of the deeper tissues is very excessive and the skin is invariably tense and white, but so soon as by means of these emollient applications a free local perspiration is secured, and the skin assumes these peculiar characteristics, the vascular tension of the interior is diminished in the same proportion, and the desired relief obtained. Of course this plan of treatment must be accompanied by strict preservation of rest to the joint. When the pain in the neighbourhood of a joint has been to some degree reduced by such treatment as this (and I never fail to note the persistence or otherwise of the special seats of pain for each joint which Mr. Barwell has so well particularised), I have seen much good arise from passive motion in the joints either forcibly, the patient being under the influence of chloroform, or gradually, from day to day, by the action of some elastic apparatus. In cases where we have to break down strong adhesions within a joint, to correct the temporary anchylosis then existing, it is needful to make provision for replacing the limb once more in its faulty position as soon as the operation is accomplished, and before the patient recovers from the chloroform; so that although the adhesions within the joint have been broken down and for a time destroyed, those parts of the cartilages which, up to the moment of the operation, had been opposed to each other shall still retain their relative position, and after the subsidence of the more acute symptoms, resulting from the extension, we can, by gradual measures, secure a proper play to the articulation. In this plan, it is needless to say, I follow Mr. Barwell's suggestion, always before the joint is moved under chloroform, to take a cast in gutta percha of the peculiar angle and form in which the joint then lies, so as to be able to replace it exactly in its unnatural position immediately afterwards, allowing it to rest there, with soothing treatment for a few days, before the secondary and more

perfect extension is attempted. Besides the emollient applications already referred to, I have found great advantage, in all the more acute stages of articular disease, by the use of the vesicating collodium (Smith's green fluid) painted over different parts of the joint, especially over the well-known favourite seats of pain; not in large patches, but small ones frequently repeated. This mode of treating joints is well known to be very serviceable in acute rheumatic arthritis, and it is not less so in many of the other varieties. Very rarely, if ever, do I apply leeches to the surface of an inflamed joint, but frequently, on the cessation of the acute symptoms, and where there is much thickening of the tissues around the joint, I have encased it in Scot's ointment or in a strong solution of iodide of potassium, in water and glycerine. With regard to injuries of the joints and their subsequent effects, I have, in making these reports, noticed this curious circumstance, that where any joint has been injured by a twist or wrench and the ill effects are immediate, they will the more quickly cease, and a perfect recovery result, than if an interval elapse in which little pain is felt, although not an entire absence of it, and then, perhaps on account of the time which has passed since the injury, more serious lameness of the joint becomes apparent. The former class of cases, in which the symptoms quickly show themselves, are possibly in subjects who possess a robust and vigorous constitution, in whom the symptoms pass away as rapidly as they come, and recovery soon follows, whilst in the languid, leuco-phlegmatic, and weak, it is some time ere the storm shows itself, and still longer before it runs through all its phases, and subsides entirely.

The joints which I have excised (Sub-class C, Table XIV) are the elbow and the knee; four of the former and three of the latter, including one case of death. I have also removed the entire astragalus in a case of compound disocation at the ankle-joint. In this case the gentleman, who was for a time an in-patient of the hospital, made an excellent recovery, and now, after an interval of nearly three years, walks so well that it is sometimes difficult to tell in which foot the tarsus has six instead of seven bones. In my cases of excision of the elbow the

results have been all that could be desired, the limbs so preserved being extremely useful. In one case, within twelve months after the operation, the man could lift a considerable weight, and push before him a barrow pretty heavily laden; in another, a woman was able to gain her livelihood by needlework, whilst in the other two cases the joints were perfectly useful, except that in one there was a little locking in the movements of supination of the hand, as if the portion of the neck of the radius still left did not rotate freely in its bed.

The first of these excisions gave me much anxiety for a time, for I discovered, within a day or two after the operation, that the woman had lost sensation in both sides of the little finger, but retained it perfectly in the ulna side of the ring finger. From this I concluded that at the time of the operation I had notched and injured the ulnar nerve, but, fortunately, not so as to cause entire paralysis. This slowly recovered itself, and in three or four months sensation returned, in some degree, on both sides of the little finger, and at the end of twelve months she could feel very plainly with it, although with a certain persistent feeling of numbness and weight, the only defect that remained being a difficulty in raising and extending the ring and little fingers. This is the case of the woman who afterwards earned her livelihood by her needle.

Of the three cases of excision of the knee one has already been commented on, *in extenso*, in the first volume of these Reports; the young man is now in excellent health, and I heard only a few weeks since that he frequently walks six and sometimes eight miles a day with a good serviceable limb, firmly anchylosed in the original position of the incision. Another case, in a woman, has gone on exceedingly well; the last I heard of her was that she was cleaning the deck of a canal barge with a broom, and working with all the energy of a man. But one case I lost, and in this there was something to be learnt in connection with the preparations which ought to be attended to before any important operation; the patient died sixteen days after it, not from any mischief in the joint itself, but in consequence of an immense abscess, which had formed on the left side of the

Table XIV.

Class III.—C. Excisions of Joints.

Part operated on.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Elbow					1	2	1				2	2
b. Knee			1			1					1	1 1
c. Astragulus							1				1	
			1		1	3 1	2				4	3 1
											8	

pelvis as the result of a troublesome fistula in ano, which had long existed, but of which, at the time, I had no knowledge; perhaps, it may be said, because, in my inquiries as to her previous health, I had not gone with sufficient minuteness into the history of her case. The abscess was very large and occasioned a great deal of constitutional irritation for several days, the exact cause of which I could not account for, till my attention was directed to the painful condition of one labium, and the side of the perinæum opposite to that on which the operation had been performed. I opened the abscess and let out a large quantity of fœtid matter, but she sank within forty-eight hours afterwards. In the two recoveries after excision of the knee the limb was placed in an immoveable apparatus, upon the plan suggested by Dr. Patrick Heron Watson, and I had every reason to be satisfied with the system which he adopts, for it is the greatest possible comfort for the patient to feel that those portions of the limb which meet at the site of the excision are kept perfectly steady, and that there is no chance of the ends of the bones being displaced; whilst he can be easily and painlessly moved in bed, the limb being slung in a cradle support. In the case that died the limb was put up in one of the straight (M'Intyre's) splints, and for some days before

I detected the perineal abscess I thought the pain of which the patient complained when attempting to move the body was from some disturbances of the parts at the knee. In two other cases which have been under my care in the hospital since these reports were closed, I have kept to Dr. Watson's method, and with excellent success. All these cases of excision were treated as strictly upon antiseptic principles as the advance of the system at the time suggested.

The next Sub-class (D, Table XV) contains injuries to the joints in the way of sprains. It is difficult, perhaps, to give a very correct description of the structural changes which take place in what are popularly called sprains, near to joints, but I am inclined to think that in most cases, at any rate, there is some laceration and consequent disintegration of tissue, either muscular, tendinous, or ligamentous. Some years ago I had an opportunity of seeing the changes in muscular tissue, which result from sprains near joints in the lower animals; a wholesale butcher showed me a few carcases of beasts in which some of the more expensive cuts had to be sacrificed on account of injuries which the animals had received from sudden sprains, whilst being driven along the then rough pavement of the crowded streets of our city. If we consider how such animals as sheep and oxen are accustomed to soft pastures with impressible soil, it will be seen how the unyielding surfaces and stones of our roads must interfere with their ordinary habits of locomotion. Hence it is that in traversing our streets they are apt to suffer sundry sprains and injuries, and so in these cases there had been invariably a distinct laceration of many fibres or bundles of fibres of fleshy tissue near to the hip-joints, chiefly in the locality of what would be the adductor muscles, as if every now and then in trotting along the animal had suddenly straddled or separated its legs over the slippery stones, and thus torn the fleshy tissue of certain muscles. In these places I always found an effusion of clotted blood, and was told by the butcher that this quickly putrefied when the beast was cut up, and the meat in these parts soon became so bad that it could not be offered for sale. With this view of what sprains may possibly be we can

Table XV.

Class III.—D. Sprains near Joints.

Part operated on.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Wrist and hand					1						1	
b. Knee						1	1				1	1
c. Ankle and foot			6	1	5	4	2	1	1		14	6
					2						2	
			6	1	6	5	3	1	1		16	7
					2						2	
											18	7
											25	

infer, I think, what are likely to be the best means of treatment. Rest must form one element, and time another, in order to permit of the slow absorption of the effused blood and the deposition of some new fibrinous matter, which shall act as a connecting medium between the ruptured fibres. The common way of treating sprains is to apply very early stimulating liniments of hartshorn and oil, and suchlike matters, to the surface of the injured joint, under the idea of preventing the stiffness and pain which might arise. But my plan in sprains near to joints has always been to use the emollient treatment before described for diseases of joints themselves, and to do this either by hot fomentations or wetted lint with oil-silk covering, for at least a few days after the injury, and then to commence, and not till then, the application of something to the surface which may stimulate the absorption of the coagulated material and yet not interfere with the healthy deposit of new matter. I find nothing answers so well as a solution of iodide of potassium in weak alcohol and water, with a little glycerine. This is an excellent

lotion, and may be applied in these circumstances on folded lint, without any other covering than a porous bandage, for as soon as the lint has been in contact with the body for a short time the spirit and water evaporate, and the glycerine remains, holding the crystals of the potash salt in suspension; these are very easily absorbed through the skin, forming a far less painful application, yet equally efficient, than the tincture of iodine, which often blisters and cracks the skin. The only other remark I have to make about sprains is, that the large majority were near the ankle-joint. Twenty-two are so recorded, two of which occurred whilst the subjects of the injury were in a state of alcoholic unconsciousness.

Following closely upon sprains are those curious affections of joints which may be classified as inflamed tendons and thecæ (Sub-class E, Table XVI); they frequently occur near the ankle, and not unusually along the line of the tendo Achillis, and in one case I had distinct evidence of the presence of effusion into the sheath of the tendons, producing a distinctly fluctuating tumour on each side of it. Rest to the joint, emollent applications, then counter irritation by the vesicating collodion, and then, if needful, strapping and bandaging to excite absorption by pressure and to keep the tendon from moving in its sheath, have, in each case, led to successful results. Among this class of cases was one of the most curious I have ever seen. It was in a man, by trade a tailor, about fifty years of age, who came into the infirmary with some injury to the right knee-joint, received, he said, about sixteen weeks previously, from the kick of a horse. Being lame from this cause, his left knee was twisted about eight weeks previously in some unaccountable way; this had caused a rupture of the tendon just above the patella, leaving a space in which at least two fingers could be placed, and giving the left knee the appearance of paralysis. A careful examination of the right knee showed that what he thought to have been the result of a kick was really the same kind of injury, namely, rupture of the common tendon of the extensor muscles, so that when he came into the hospital he could neither stand nor walk without assistance, and was as if the subject of complete paraplegia.

Table XVI.

Class III.—E. Inflamed Tendons and Thecæ.

Near to—	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Wrist and hand ...	...	...	...	...	...	1	...	...	...	...	...	1
b. Knee	...	...	...	...	1	...	...	...	...	...	1	...
c. Ankle and foot ...	1	...	1	...	3	...	...	...	...	...	5	...
	1	...	1	...	4	1	...	...	...	...	6	1
											7	

I made careful inquiries as to his previous history to see if there was any peculiar diathesis, in the way of syphilitic poison or rheumatic tendency, but this I could not discover. There had been no abrasion or rupture of the skin on the part, either when he was kicked by the horse or when the left foot was twisted. The case was too clear to lead to any obscurity of diagnosis, there was nothing wrong in the joints themselves, and the only question was as to the best plan to be devised for his relief. Mr. Wood, of this city (our instrument maker), very ingeniously contrived an apparatus for the knees, which by means of a short lever on each side of the joint, connected by a cross-piece, could be pulled up by an elastic india-rubber spring, such as Mr. Burwell employs for club feet, only on a larger scale, and this arrangement so far supplemented the lost power of the extensor muscles that the patient, to his great delight, could stand erect and walk firmly almost as soon as the apparatus was adjusted. I watched the case for some time, and although it seemed as if the space between the ends of the ruptured tendons diminished slightly, there still remained a permanent depression and loss of muscular tissue.

In the next sub-class are placed those cases of enlarged

bursæ near the joints, which I have had to treat. It will be noted in Table XVII that out of nine cases seven were near to the knee-joint, one at the elbow, and one near the ankle. Of those near the knee, six were in the usual position, being enlargements of the subcutaneous bursa, which is, in my opinion, erroneously spoken of as a bursa patellæ, whereas its true situation should entitle it to the cognomen of *bursa ligamenti patellæ*, as it is far more frequently found over the ligament than upon the patella itself. In one of these cases the enlarged bursa was of immense size; it occurred in a woman aged thirty, and was of such magnitude that when tapped with the trochar and canula nearly fourteen ounces of fluid of a coffee-ground colour, and specific gravity of 1·027, were taken out; I then injected nearly the same quantity of a solution of tincture of iodine and water, in the proportion of one to twelve; this was retained for five minutes and then drawn off. Before withdrawing the canula a brass wire spiral drain-tube was introduced, and allowed to remain in the sac of the bursa for eight days, it was then removed, the knee carefully strapped and bandaged, and an excellent recovery followed. Another case was at the back of the knee-joint, and although I have seen others in a similar position they are not recorded in these reports. This case seemed to be connected with the tendon of the semi-membranous muscle, and occurred in a little girl aged eight. When tapped I drew off two drachms of clear amber-coloured fluid, and injected about the same quantity of undiluted compound tincture of iodine, placed the limb in a splint and kept it so for several days. A certain degree of suppuration was set up, with some irritative fever, which for a time delayed the cure, but in about five weeks afterwards she went out perfectly well. It has often occurred to me that cases of enlarged bursæ in the popliteal space might simulate the character of aneurism, for although there would be absence of expansile pulsation, yet there might be transmitted pulsation and an *arterial bruit* from pressure on the vessels, and some little care would be needed to render the diagnosis quite certain. The distinction between chronic abscess and enlarged bursa is not quite so easy; one sign which I think valuable is, that in a case of abscess in the

Table XVII.

Class III.—F. Bursæ near Joints.

Near to—	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Elbow	...	...	...	...	1	...	...	...	...	...	1	...
b. Knee	...	1	...	3	...	3	...	...	...	...	...	7
c. Ankle and foot ...	...	...	...	...	...	...	...	...	1	...	1	...
	...	1	...	3	1	3	...	...	1	...	2	7
											9	

popliteal space, as the swelling increases it assumes an acuminated form, and becomes more or less conical at some part, until a tendency to burst gradually becomes apparent. This, however, in the cases I have seen, never takes place in enlarged bursæ, but so long as the tumour increases in size it still preserves its hemispherical or nearly globular outline, stretching the tissues which cover it in a very equable manner. In acute cases, near the elbow, which often result from sudden blows on the olecranon, and very frequently produce great inflammation of the surrounding parts, seeming to implicate the joint itself, the diagnosis for a time is often obscure. But these swellings have very little tendency, if any, to point, or to burst spontaneously, and they generally present a flattened, though somewhat globular form.

The enlarged bursa in the foot, which I have recorded, must be accounted an aggravated form of bunion, and, indeed, as the late Mr. Aston Key used to teach, a bunion on the great toe is very generally an enlarged bursa near to the internal lateral ligament, arising from displacement of the phalanx, and rupture or distension of the neighbouring tissues.

In the next Sub-class (G, Table XVIII) I have placed the only case of loose cartilage in a joint which has come under my

observation. This was a well-marked example in the knee, and it was possible, occasionally, when the joint was flexed to a certain degree, to feel the cartilage very distinctly, and to move it about on one side of the ligamentum patellæ; unfortunately, when everything was arranged for its removal, the man took fright, and on the morning of the day fixed for the operation he left the hospital.

In the last Sub-class (H, Table XIX) are recorded the cases of talipes. They are only two, for in these, as in similar affections of the joints in young children, the greater number of those coming to our infirmary are treated as out-patients. These, however, were from a distance, and in one case the deformity existed in both feet; they were both talipes varus, and were treated at first with the tin splint suggested by Dr. Porter, of Dublin, as a means of fixing the heel as well as the sole, and gradually everting the foot by drawing the upright portion of the splint towards the calf of the leg. After a short interval I applied Mr. Barwell's system of elastic bands, in each case with excellent results. While they remained under observation in the single case and in one foot of the double case the feet became perfectly natural in form and movement, but as in the latter the child was not brought regularly to the hospital on account of illness, I fear it has not turned out permanently successful.

Table XVIII.

Class III.—G. Loose Cartilages in Joints.

Loose cartilages in—	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
α. Knee-joint	...	...	...	...	...	...	1	...	...	...	1	...

TABLE XIX.

CLASS III.—H. Talipes.

Talipes.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. T. Varus—Right...	...	1	...	...	...	...	...	...	...	...	...	1
b. „ Duplex	1	...	...	...	...	...	...	...	...	...	1	...
	1	1	...	...	...	...	...	...	...	...	1	1
											2	

CLASS IV.—*Dislocations, &c.*

We now enter upon the consideration of the fourth group of cases, which I have arranged as A (dislocations) and B (fractures). Under the first of these I have only five cases to report, two of the shoulder, one of the elbow, and two of the hip. The reason why dislocations of the shoulder appear in such small numbers in these returns is, that they are almost invariably treated in the accident room, or as out-patients. Only one of the two cases here mentioned requires any special comment; it was that of a man aged 63 years, who had dislocated his left shoulder fourteen days previously, and in whom, after the most persevering attempts, I was unable to reduce it, even when the patient was placed under chloroform and all the processes of manipulation resorted to. Two attempts were made, the second in the presence of our consultation, when I had the assistance of the late Mr. Dumville, who, as is well known, took great interest in such cases, and by whose advice no further efforts were made to reduce the bone. The age of the man, and the possibility of injuring some of the more important tissues in the axilla, especially the artery, which was somewhat *atheromatous*, determined me to accept his opinion.

Possibly, in this case, the cause of the difficulty in the reduction may have been due to some unusual position of the head of the bone, in reference to the rent of the capsule which took place at the time of the accident, for it is noted as a sub-coracoid dislocation. In this, as in many other cases of injury to the shoulder-joint from acute inflammation, anchylosis, and other changes, I have had an opportunity of observing how wonderfully motion in the shoulder may be acquired by the muscles which move the scapula acting afterwards more powerfully than before the accident, without any change in the relation of the head of the humerus to the glenoid cavity. Of the two cases of dislocation of the hip, one was easily reduced by the manipulation method, whilst under chloroform; the other, which, from the shortening, and eversion of the foot, seemed when first admitted, exactly like a case of fracture of the neck of the thigh-bone turned out to be, on more careful examination, a case of dislocation of the head of the thigh-bone on to the pubes. This was reduced by manipulation after some trouble, but not until the head of the thigh-bone had been displaced into the *obturator foramen*, and then into the sciatic notch, whence at last it was dislodged from this false position forwards and inwards into the acetabulum.

We now come to the examples of simple fractures (Class IV, B, *a*), which in number, as might be expected, are very considerable. But still we have a paucity of cases of fracture in the upper as compared with those in the lower extremities, on account of the former being so generally treated as accident-room patients.

In Table XXI I have arranged the simple fractures in such a way as to show the number which have occurred to the different bones in each of the five periods of life, into which the majority of these tables are divided, and further indicated by separate rows on which side of the body each particular fracture had occurred, and in the last two columns the total number on each side. From this we learn how much more prone certain fractures are to occur at special periods of life; it seems, for instance, that infancy and old age are most liable to simple fractures of the thigh, in the former the length of leverage in the femur disposing it to snap

Table XX.

Class IV.—A. Dislocations.

Articulations.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Shoulder	...	...	...	...	1	...	...	...	1	...	2	...
b. Elbow	...	...	...	...	...	...	1	...	...	...	1	...
c. Hip	...	...	...	...	...	...	1	1	...	...	1	1
	...	...	...	...	1	...	2	1	1	...	4	1
												5

Table XXI.

Class IV.—B. Fractures.—*a.* Simple.

Part.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.		Side.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	R.	L.
Face R.	1	...	2	...	...	...	...	...	...	...	3	...	3	...
Face L.	...	...	1	1	...	...	...	...	...	...	1	1	...	2
Clavicle R.	...	...	...	...	1	...	2	...	...	...	3	...	3	...
Clavicle L.	...	...	...	1	...	...	...	...	...	...	...	1	...	1
Humerus R.	1	...	1	...	...	...	1	...	1	...	4	...	4	...
Humerus L.	...	...	1	...	1	...	...	...	...	1	2	1	...	4
Ulna R.	...	...	1	...	...	...	1	...	...	...	2	...	2	...
Ulna L.	...	...	1	...	...	...	...	...	...	...	1	...	...	1
Radius R.	...	...	1	...	...	...	...	...	...	...	1	...	1	...
Radius L.	...	...	2	...	...	...	...	...	...	...	2	...	...	2
Ulna and Radius R.	1	...	1	...	...	...	...	...	1	...	3	...	3	...
Ulna and Radius L.	...	...	3	...	...	...	...	...	...	...	3	...	...	3
Hand L.	...	...	...	...	1	...	...	...	...	...	1	...	...	1
Ribs R.	...	...	1	...	3	...	3	...	1	...	8	...	9	...
	...	...	...	...	...	...	1	...	...	...	1	...		

Part.	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.		Side.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	R.	L.
Ribs.....L.	...	...	2	...	2	...	1	...	...	...	5	...	...	5
	...	...	...	...	...	...	...	...	...	...	...	...		
Pelvis.....	...	...	...	...	...	...	1	...	...	...	1	...	1	...
	...	...	...	...	...	...	...	...	...	...	...	...		
Femur.....R.	10	5	8	...	2	...	5	...	4	3	29	8	37	...
	...	...	...	...	...	...	...	...	...	...	...	...		
„ .....L.	6	2	10	1	1	...	3	...	2	2	22	5	...	30
	...	...	...	...	1	...	2	...	...	...	3	...		
Patella.....R.	...	...	...	...	...	...	...	...	1	...	1	...	1	...
	...	...	...	...	...	...	...	...	...	...	...	...		
„ .....L.	...	...	1	...	...	...	2	...	...	...	3	...	...	3
	...	...	...	...	...	...	...	...	...	...	...	...		
Tibia .....R.	2	...	2	...	4	...	5	2	1	...	14	2	18	...
	...	...	...	...	1	...	1	...	...	...	2	...		
„ .....L.	2	...	2	1	2	1	3	...	1	...	10	2	...	12
	...	...	...	...	...	...	...	...	...	...	...	...		
Fibula .....R.	1	...	5	...	7	...	2	4	1	...	16	4	20	...
	...	...	...	...	...	...	...	...	...	...	...	...		
„ .....L.	...	...	7	1	3	2	7	3	1	1	18	7	...	26
	...	...	...	...	...	1	...	...	...	...	...	1		
Tibia and Fibula...R.	1	1	9	1	7	...	10	5	2	...	29	7	43	...
	...	...	2	...	2	...	1	2	...	...	5	2		
„ „ ...L.	1	...	6	...	6	1	1	1	1	...	15	2	...	21
	...	...	...	...	1	...	3	...	...	...	4	...		
Foot.....R.	...	1	1	...	...	...	...	...	...	...	1	1	2	...
	...	...	...	...	...	...	...	...	...	...	...	...		
„ .....L.	...	...	...	...	...	...	1	...	...	...	1	...	...	1
	...	...	...	...	...	...	...	...	...	...	...	...		
	26	9	68	6	40	4	48	15	17	7	199	41	147	112
	...	...	2	...	5	1	9	2	...	...	16	3		
											215	44=	259	

under sudden strain, often in the centre; whereas in the latter the fracture occurs most frequently at the upper part, near to the neck of the bone. In fractures of the leg it will be seen that a large number of them involve both bones, but when only one bone is broken it is oftener the fibula than the tibia. The total number of cases of simple fracture are 259, of which 215 occurred in males, and 44 in females, the proportionate number of the cases being very nearly the same at each period of life.

As to the mode of treatment, I have not much to tell. In the

thigh the long splint has been almost invariably employed, and the double inclined plane quite the exception. I have tried in two of the cases—one in an old man aged seventy-eight, and the other in a child—Professor Syme's method of using the long splint folded in a sheet wrapped entirely round the limb, but it has appeared to me that, with the class of patients we have to treat in hospital practice, this method has some disadvantages, chiefly in point of cleanliness, and, therefore, I prefer the simple long splint with perineal strap, and, if necessary, the additional use of weight-extension, as in diseases of the hip-joint. In fractures of the ribs, which it will be seen are not very numerous, I have employed Mr. Hilton's plan of strapping only the injured side of the chest, and where the strips of plaster can be well applied and made sufficiently adhesive, it certainly is a most comfortable mode of treatment for the patient, and enables us to allow of much more movement in respiration than girthing the thorax with a roller bandage. In fractures of the leg, where the tibia was injured or both bones involved, I have used most generally the straight-back splint for the leg with sole piece for the foot, taking care to place the limb in that position which Sir James Paget has so well defined; "never to overlook the three points of contact in the foot, viz. the heel, the ball of the great toe, and the ball of the little toe, and see that they remain in their proper relation to the axis of the leg." Some of the cases, however, have been placed on the side and treated in the *semiflexed* position recommended by Mr. Pott, but there is this disadvantage in it (according to my experience), that unless great care be taken there is a tendency for the heel to be carried too far backwards, and to produce deformity after the union of the fracture. Side splints are placed where needful, and these I generally direct to be made of the split splints, or Gooch's splints, as they are usually called. In fractures of the leg Salter's swing splint and cradle have been used as often as possible. In fractures of both bones of the forearm, which, as the returns will show, have rarely been treated as in-patients, I have insisted at all times upon the importance of not allowing these fractures to remain fixed in the splint without movement for too long a time after the accident.

I believe many cases of permanent inability to pronate and supinate the hand after fractures of the bones of the forearm, are caused by the limb having been retained too long a time in one position, the bones being pressed by the bandages too much towards the middle line of the limb. This possible error may be prevented by always undoing such fractures at the end of the first week or ten days, and, if all be well, carefully replacing the splints. The position I prefer is, in every case, that which shall place the hand in a semi-prone posture, with the thumb directed upwards and the hand a little disposed to be bent downwards, being the same as in Colles's fracture of the radius, where the pistol splint is used; and this position slightly varied is a very good one, I believe, for fractures at any part of the double bones.

We now pass on to the more important injuries of compound fractures (Class IV, B, *b*, Table XXII),* in which I have to report forty-five cases.

Of these, five died, one, a case of compound fracture of the thigh in a child five years of age, twenty-one hours after the receipt of the injury; another, a case of compound fracture of the leg in a man aged fifty-six, four days after the accident. A similar injury, attended with epileptic fits, terminated fatally in twenty-three days. In the fourth case, a compound fracture of the thigh, the patient died thirty days after the injury, amputation not being permitted; and the fifth, a very tedious case, in which a woman aged twenty-four with a compound fracture of both bones of the leg near the ankle, caused by jumping out of a window, was under treatment for more than eight months, during the latter part of which time she showed symptoms of rapid phthisis, she, however, repeatedly declined to consent to amputation, although, uncertain as the result would have been, it was the only possible means of saving her life. All the other cases, forty in number, made good recoveries, and with the exception of some secondary abscesses which occurred in bruised tissue along the lines of tendons, or as a consequence of cellulo-membraneous

* All the bones indicated in this table were the subject of compound fracture, except those marked in italics, and these were *not* in communication with the external wound.

Table XXII.

Class IV.—B. Fractures.—*b*. Compound.

No.	Initials.	Age.	Sex.	Part.	Side.	Cause.	Result.	Days in hosp.	Mode of treatment of wound.
1	J. B.	19	M.	Tibia, *Fibula*	L.	Coal tub in mine	Rec.	93	Lister.
2	W. B.	38	M.	Tibia, *Fibula*	R.	Drunk, run over	Rec.	85	Carb. oil.
3	M. B.	30	M.	Malar bone	R.	Fall of seven feet	Rec.	9	Carb. lotion.
4	J. B.	21	M.	Tibia, *Fibula*	L.	Fall	Rec.	99	Lister.
5	T. B.	43	M.	Humerus, near elbow	R.	Railway	Rec.	26	Lister.
6	R. B.	32	M.	Tibia, Fibula	L.	Iron weight	Rec.	66	Carb. oil.
7	M. B.	24	F.	Tibia, *Fibula*	L.	Fall fm. window	Died	253	Lister, phth.
8	H. B.	48	M.	Tibia	R.	Drunk, fall	Rec.	70	Carb. oil.
9	D. C.	38	M.	Skull	...	Fall	Rec.	12	Carb. lotion.
10	E. H. C.	32	F.	Tibia, *Fibula*	R.	Epileptic, fall	Died	23	Carb. oil.
11	J. C.	11	M.	Tibia, *Fibula*	L.	Run over	Rec.	25	Cerecloth.
12	T. C.	14	M.	Humerus	L.	Machinery	Rec.	116	Carb. oil.
13	G. D.	25	M.	*Ulna*, Radius	R.	Fall	Rec.	7	Lister.
14	J. W. D.	18	M.	Tibia, *Fibula*	L.	Barrel of goods	Rec.	56	Lister.
15	H. D.	29	M.	Mid. Femur	R.	Cart wheel	Rec.	54	Cerecloth.
16	E. D.	11	M.	Ulna, Radius	L.	Fall	Rec.	11	Cerecloth.
17	G. D.	19	M.	Tibia, *Fibula*	L.	Cart wheel	Rec.	87	Lister.
18	T. D.	16	M.	Tibia, *Fibula*	L.	Machinery	Rec.	61	Carb. oil.
19	R. G.	30	M.	Condyle, Humerus	L.	Fall	Rec.	70	Lister, lac.
20	W. G.	3	M.	Tibia, *Fibula*	L.	Crushed by flag-stones	Rec.	51	Lister, lac.
21	W. G.	25	M.	Tibia, Fibula	R.	Kicked by horse	Rec.	44	Lister, lac.
22	J. H.	30	M.	Lower 4th Femur	L.	Fall from 'bus	Died	30	Carb. oil.
23	H. H.	20	M.	Tibia, Fibula	L.	Bale of goods	Rec.	82	Carb. oil.
24	J. H.	23	M.	Lower jaw	R.	Epileptic, fall against iron bar	Rec.	22	Dry lint.
25	R. H.	39	M.	Mid. Humerus	R.	Fall in coal-pit	Rec.	12	Carb. oil.
26	J. J.	48	M.	Tibia, Fibula	R.	Fall in wrestling	Rec.	65	Carb. oil.
27	J. J.	44	M.	Tibia, Fibula	L.	Blow from flag-stone	Rec.	54	Lister, muslin.
28	M. K.	5	M.	Mid. Femur	R.	Run over	Died	21 h.	Carb. oil.
29	E. L.	48	M.	Tibia, *Fibula*	L.	Drunk, cart wheel	Rec.	121	Lister, lac.
30	J. L.	60	M.	Tibia, *Fibula*	L.	Fall of building	Rec.	96	Lister, musl.
31	J. L.	65	M.	Ext. Condyle, Humerus	R.	Fall	Rec.	53	Lister.
32	J. M.	52	M.	Tibia, *Fibula*	L.	Kicked in wrestling	Rec.	39	Cerecloth.
33	J. M.	39	M.	Nasal-bone	...	Kick	Rec.	35	Carb. lotion.
34	P. M.	38	M.	Tibia, *Fibula*	R.	Fall	Rec.	41	Cerecloth.
35	P. P.	36	M.	Tibia, Fibula	L.	Iron plate	Rec.	57	Lister, musl.
36	W. P.	24	M.	Tibia, *Fibula*	L.	Fall	Rec.	95	Lister, musl.
37	A. R.	38	M.	Fingers	R.	Brick wall	Rec.	3	Cerecloth.
38	J. R.	30	M.	Tibia, *Fibula*	R.	Drunk, fall	Rec.	40	Cerecloth.
39	J. S.	33	M.	Tibia, *Fibula*	L.	Fall	Rec	147	Lister, lac.
40	G. S.	56	M.	Tibia, *Fibula*	L.	Fall	Rec.	15	Lister, musl.
41	C. S.	21	M.	Tibia, Fibula	R.	Cart wheel	Rec.	41	Cerecloth.
42	J. S.	56	M.	Tibia, Fibula	R.	Inj. to head, fall	Died	4	Carb. oil.
43	R. S.	48	M.	Tibia	R.	Fall, 35 feet	Rec.	64	Cerecloth.
44	W. S.	22	M.	Tibia, *Fibula*	R.	Fall in mine	Rec.	67	Lister, musl.
45	C. W.	11	F.	Tibia, *Fibula*	L.	Kicked by horse	Rec.	27	Cerecloth.

inflammation, they all recovered in the periods of time indicated in the table.

It is impossible to arrive at an average of the number of days occupied by these cases, inasmuch as we cannot describe the exact peculiarities of each, either as to the intensity of the injury or the special powers of repair of each individual constitution. They were all treated upon antiseptic principles, even from the earliest cases here mentioned; the exact method, as far as it could be explained here, is indicated in the last column of the table, Lister's being the prevailing one, and the particular modifications of it being the use of the carbolised oil, lac plaster, and cerecloth, and in a few cases the watery solution of carbolic acid only. No cases of injury have seemed to show so well the good effects of the antiseptic method as compound fractures. Surgeons, from their earliest experience, must always have felt the great uncertainty of these cases, not only as to probable duration of treatment, but also as to the effects upon the constitution. If we seek for a reason we have not far to look; to produce a compound fracture the injury must be so intense as to disintegrate, not only the bony structures of the part, but also the softer tissue must suffer in proportion. With the injury to the bone a portion of the periosteum will certainly be detached, and with it the nutrition of the bone will suffer, and most likely death of the part result. A piece of bone thus dead, lying like a foreign body at the bottom of the wound, will permit the excretions of the part to rest in its porous tissue, there to undergo those same chemical changes which they would do if truly *extra corpus*, under similar conditions of heat, moisture, exposure to air, and tendency to putrefy. Thus it is hardly possible to treat a case of compound fracture with an extensive external wound, without having evidence of septic changes. It is to prevent these that our efforts should be directed, either by simply covering the wound by any means which may be found certainly efficacious, or, if this be not possible, by the use of such remedies as experience has shown will avert putrefaction, and some test should be employed to warn us of the approach of this condition. It is useless to wait until we have the grosser signs of its presence, in the fetid smell of the noxious

exhalations from the wound; precautionary measures should be commenced at the earliest possible moment of the treatment, to anticipate and prevent these changes, for it is an axiom in the antiseptic treatment that "it is easier to prevent the advent of putrefaction than to arrest its progress when once established." The absence of constitutional irritation in all the above cases has attracted not only my attention, but also that of all who have watched the daily progress of them with me in our wards, and if it were only on this account, that compound fractures treated upon antiseptic principles lose their constitutional character, and become resolved into completely local injuries, then, I think, those who have watched such cases treated upon these principles should feel it a duty to advocate them, if not with more earnestness, possibly with greater weight and authority, than I can boast.

One of the greatest compliments ever paid to the utility of the antiseptic method of treating wounds, by an eminent modern surgeon, is to be found in some remarks by Mr. Cooper Forster in his "Surgical Clinical Records," published in the 'Guy's Hospital Reports,' vol. xviii, p. 102, 1873, where he says—"But yet, though nothing definite can be fixed upon in its favour, I think, if I should happen to be the subject of a compound fracture, I should like my case treated by Mr. Lister's plan." What could the most ardent admirer of antiseptic surgery wish for more than such testimony as this, and from such a source?

When the wounds resulting from a compound fracture, have so nearly cicatrised, as to leave on the surface only a portion of unhealed tissue less than half a square inch in extent, I have had recourse to the use of what I have already called the *burn ointment*, and find it an excellent application, even when there is reason to suspect that the wound, in any way, communicates by sinus with a portion of dead bone which must be exfoliated.

On referring to the table, it will be seen that these injuries have occurred chiefly in middle life, between the twentieth and fortieth year, in which period the subjects of them would be exposed to the greatest amount of risk in following their laborious occupations; and it will also be noted how small a proportion of these severe

cases have occurred to women as compared with men; out of the forty-five cases there having been only three in females.

In Class V, are the cases of injuries and diseases of the blood-vessels; A. arteries, B. veins, as in Table XXIII.

TABLE XXIII.

CLASS V.—A. Arteries.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Wounds of	1		1		4		1				7	
					1		1				2	
b. Atheroma of ...							1		1		2	
c. Aneurisms					1			1			1	1
d. Lig. of femoral					1						1	
e. „ ext. iliac							1				1	
	1		1		3		3	1	1		12	1
					1		1				2	
											14	1
											15	
B. Veins.												
a. Varicose, ligature						1						1
b. Varicocele, ligature					1						1	
					1	1					1	1
											2	

Of the wounds of arteries, I have no special cases to relate, but only such as were treated on the general principle of tying both ends of the divided artery where possible. In aneurism, however, I

have had four cases, in three of which a cure was effected, one of the popliteal by pressure, one by ligature, and one of the external iliac by ligature, besides one case of aneurism of the femoral in which the sac had burst before the patient was admitted into the hospital, and which proved fatal partly from the effect of shock, and partly from fatigue of a very long journey, which he had to undergo in coming here.

The case of popliteal aneurism cured by pressure, was in a man who then had a double aneurism, a large one on the right side, and a small one commencing on the left. In this case, after other means had failed, I used the three-pad tourniquet which I exhibited at the recent meeting of the British Medical Association in London, and since these reports were drawn up, this same patient has been under my care in the hospital, for the aneurism of the opposite popliteal artery, which has yielded to treatment by pressure of the same instrument. In the case of the ligature of the femoral and of the external iliac artery, the operations were conducted most carefully upon Mr. Lister's principles, and with excellent success; no pus being formed, and no trouble experienced in reference to the circulation in the limb, pain or inconvenience to the patient, or any signs whatever of secondary hæmorrhage. In diseases of the veins including varicocele which I have placed here, away from diseases of the testes, I have only had two cases, one of enlarged veins in the thigh and leg in a woman aged thirty-nine, who for many years had been working as a factory operative, and had suffered intensely from the pain attendant upon the distension of the vessels. I compressed the veins by means of hare-lip pins and twisted sutures, following very minutely the instructions given by Prof. Erichsen, so as not to transfix the veins themselves, or if this were done by accident to desist immediately from applying the ligature, and to select some other part of the vessel. The cure was perfect, and many months afterwards the woman had discovered no return whatever of the disease. In the varicocele an instrument was employed which I have used frequently in private practice for the same disorder, that is, the serre-nœud of M. Ricord, the ligatures being passed round the veins according to his

method, and in this case, as in many others I have so treated, the most successful results have ensued. This method has been specially recommended within the last few years by Mr. Walter Coulson, and I can thoroughly endorse all he has said upon the facility and usefulness of this operation.

In Class VI, A (injuries to brain), I have had thirty-four cases, thirty-two males and two females; the preponderance of the former is what might be expected, the rougher sex being the more exposed to causes of injury. By referring to Table XXIV, it will be seen that four cases occurred as the result of drunkenness, one of which proved fatal. These injuries have varied considerably in intensity, from the slightest effects of concussion to those serious organic injuries which have been complicated with fracture of the skull. There is, however, only one which calls for special mention; it was undoubtedly a case of fracture of the base of the cranium, and during life the cerebro-spinal fluid escaped from one ear, it was collected in a small test-tube, to the amount of an ounce and a half, in about three hours, slightly stained with blood. When allowed to settle, and carefully examined, it was found to present several very interesting physical properties, one of which was, that, unlike to serum of the blood, for which it might have been mistaken, it was neutral or very feebly alkaline to test-paper, and only faintly coagulable by heat and nitric acid; but there were mixed with it some red globules of blood, and after the fluid so mixed had stood quiet for twelve hours it was visible to the naked eye that the red particles had separated and fallen to the bottom of the fluid, there presenting a remarkably bright crimson or nearly scarlet colour, and a distinctly spherical figure. From this I conclude that it may be fairly inferred that the fluid in which they were then placed was not only not *serum sanguinis*, but the *cerebro-spinal* fluid, which is of a less specific gravity; for, on the principles of endosmose, the lesser fluid would penetrate to the interior of the globules, which, like cherries in a bottle of brandy, would become distended, almost to bursting. This interesting experiment, therefore, performed for me by nature, proves, I think, that the density of the cerebro-spinal fluid is less than that of the *liquor sanguinis* itself. I regret that in this

TABLE XXIV.

CLASS VI.—A. Brain.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Concussion	8	2	2		5		3		1		19	2
					2		1	1			3	
b. Epileptic fits							2				2	
c. Fract. of skull			1	1		3		1			1	5
	8	2	3	1	5	4	5	1	1		22	6	2
					2		1	1			3	1	
											25	7	2
											34		
B. Spinal Cord.													
a. Concussion			1		5						6		
b. Paralysis	1			1	2			1			2	1	1	1
c. Fract. of Vertebra					2		1				3		
d. Diseased Vertebra				1								1	
e. Tetanus			1		1						2		
f. Neuralgia and Neuromata		1			2						2	1	
	1	1	2	2	10	2	1	1			12	4	3	1
											20			

instance I did not test the fluid for the presence of sugar, which is said to have been found to be occasionally a constitutent.

In two cases, concussion followed falls occasoned by epileptic seizures; these were both in persons beyond the middle period of life.

The injuries to the spinal cord (B), as shown in the same table, were chiefly of the nature of concussion, of which there were six cases, three of fracture of the vertebræ, two in which tetanus occurred, and five in which paralysis followed

the injury. In one of these, in a girl aged sixteen years, there were well-marked symptoms of injury to the spinal cord by direct violence caused by a punctured wound. My notes of the case are that, "in the middle of the night she was seen by a policeman to be ill-treated by a man with whom she lived, and who, it was afterwards found, had stabbed her with a penknife, in the back of the neck, about on a level with the seventh cervical vertebra, to the left side of its spinous process, the wound running about one inch and three quarters upwards and inwards. There was some hæmorrhage from the wound, which soon ceased."

She was brought into the hospital, and very shortly afterwards complained of a feeling of weakness and partial loss of power in the left arm and leg, but no loss of sensation. The wound was dressed with a pad of lint dipped in weak carbolic lotion, and in twenty-four hours the loss of power in the left limbs was more marked, but there was no loss of sensation whatever. On the third day the left pupil was observed to be smaller than the right, and that was the only additional change. On the sixth day the left pupil became dilated and there was observed distinct ptosis on that side, with a well-marked external strabismus. With these symptoms she seemed to have a little returning use of the left arm, and could, on the ninth day, almost close the left hand naturally. She then complained for the first time that her right side was numb, as far as sensation was concerned, but with perfect power of motion, and I found this was truly the case, not in the face, nor at all on the shoulder, but just up to the margin of the axilla and down the whole of the right side, nearly to the middle line in the abdomen. In three days after this, it is noted that "the loss of sensation extends along the whole of the right side, up as far as edge of anterior fold of axilla, no loss of sensation in the right arm nor in the upper surface of the shoulder on the right side of neck. Wound now healed, to all appearance as nearly as possible, except at the lower angle."

At the end of three weeks all these symptoms had gradually subsided, and as far as I could depend upon the testimony of the patient, and judging from my own observation, perfect sensation had returned on the right side. There was a little ptosis in the left

eyelid, but the power of motion in the limbs of that side seemed to be completely regained. There can be no doubt, I think, that in this case the punctured wound had, in the first instance, implicated the anterior column of the cord on the left side in the cervical region, and the loss of motor power on the same side, with no loss of sensation, until some days afterwards, when the posterior columns were involved in the morbid changes, and the sensory disorder showed itself in the opposite side of the body, proved manifestly that the nerves of sensation decussate in the cord, as observed in the experiments of Brown-Séquard, affording, therefore, during life, an interesting pathological illustration in confirmation of the same. Most probably the later symptoms, which were caused by intra-cranial changes, were due to extension of irritation as far as the termination of the anterior column in the *crus cerebri*, near the region of the third nerve, with the ptosis and paralysis of nearly all the other motor muscles of the eyeball, except the external rectus. This may either have been produced by extension of the irritation from below upwards, from spinal cord to brain, or, more probably, to a certain degree, by pressure from effusion of blood or serum, the subsidence of the symptoms being afterwards brought about by its subsequent absorption.

Associated with this injury of the spinal cord, I may refer to a very curious case of persistent neuralgia in the heel which was present in the person of a man aged twenty-eight, who until four years previously had been a soldier in active service. He said he had sprained the heel about five years before he left the army, and he had, for nine years past, suffered the most intense pain in the lower surface of the left heel, for which he had been subjected, without benefit, to a great variety of treatment. On investigation it appeared as if the true source of the neuralgia was to be sought for in the condition of the spinal cord itself. He had received many injuries to the spine by falls from his horse and in other ways, and it seemed as if the intense pain in the heel which had always been treated as a local disease was an aberrant nervous impression caused by centric mischief. He was considerably benefited by the use of very large doses of quinine, the constant application of tincture of iodine, and then, after some

weeks, the repeated use of small blisters over the lower portion of the lumbar region and the upper part of the sacrum. I gave him large quantities of the iodide of potassium, under the impression that there might be some syphilitie taint at work, but no special amelioration of the symptoms occurred whilst he was fairly under its influence. The quinine, rest, and counter-irritation were the most serviceable of any treatment he had received.

One case of tetanus which I have to report was benefited in a marked degree by the treatment I will now detail. He was a man, twenty-three years of age, whose foot had been crushed by some heavy body falling upon it, which had contused to an excessive degree all the soft tissues of the ungual phalanx of the great toe, and the index toe of the left foot, with fracture of both these bones. On the twenty-first day after the injury, when the fracture seemed to have united and the case appeared to be doing well, the parts having completely recovered their healthy appearance, he was suddenly seized with a feeling of coldness down the back, as if from rheumatic lumbago, and inability to open the mouth or protrude the tongue without difficulty, and, within a few hours, the abdominal muscles became tense and rigid. I then observed great hardness of the masseter muscles on each side of the face, and he was immediately placed under the following treatment:—To have hypodermic injections of a quarter of a grain of morphia into the leg of the injured side every six hours; to take 15 minims of the tincture of Indian hemp every two hours, and in twenty-four hours 12 oz. of brandy; tincture of opium one part with two parts of water to be applied constantly over the cicatrix on the toes. This treatment was uninterruptedly continued for eleven days, during which time the tetanic symptoms increased in severity for about three days, and then very gradually and completely subsided.

The other case of tetanus was in a man, aged eighteen years, and came on after a blow on the back of the head, received seventeen days before his admission into the infirmary; the wound, which had been two inches long, and passed across the occiput, appeared to be quite cicatrised with hard thickened cuticle over it. The patient was seized with very similar symptoms to those described

in the last case. Precisely the same plan of treatment was pursued, only I find by my notes that the hypodermic injection of morphia was given every four hours, and the tincture of Indian hemp every three hours; an opiate lotion was applied to the back of the head over the cicatrix, which, when softened by moisture, showed that the cuticle was not perfectly entire and that the healing process had not been absolutely completed. On the third day of this treatment he had two sharp attacks of opisthotonos, and these recurred at intervals of sometimes four, and occasionally six, hours, for four days afterwards, yet deglutition was not materially interfered with, so that the remedies could be administered very regularly. After this, with one exception, on the ninth day, no further spasms occurred, and from the tenth to the eleventh day the stiffness of the neck, of the sides of the jaw and of the mouth ceased, and pursuing exactly this method of treatment he made a good recovery, leaving the hospital four weeks from the date of his admission.

We may conclude from these two cases, that in the management of tetanus occurring at the time of the healing of superficial wounds, it is necessary to support the nerve power of the body by the very free administration of alcohol, to soothe the irritable incident nerves of the injured part by local sedatives and the hypodermic use of morphia, and to bring about that peculiarly sustaining, yet calmative, effect which is attributable to the use of the Indian hemp, with as much nourishment in the way of the ordinary appliances of beef tea, milk, &c., as can be administered, are the indications to be fulfilled, and by these we may hope, with some degree of confidence, to tide our patient over this most terrible disease. Yet I am not forgetful that it has been said by good authorities, "if a patient suffering from idiopathic tetanus pass through a certain number of days of the disease he must recover, as in that time the abnormal irritability of the nervous system will have at length exhausted itself;" so that many of our reported cures may be illustrations of the motto, *post hoc non propter hoc.*

In one good case of neuromata attached to the superficial nerves of the thigh, I removed a large tumour from over

the surface of the left popliteal space and another from the front of the left forearm in the same person. They had occasioned very distressing symptoms and the recovery was perfect; but the interesting points were that in the diagnosis of the tumours it was clear they were closely united to the nerves, for no pain was experienced when they were pressed from side to side transversely to the line of the nerve, and they seemed to be freely moveable in those directions, but as soon as the tumour was drawn, either upwards or downwards so as to stretch the nerve, the most exquisite pain was instantly produced. Where it is necessary to fix a precise diagnosis between the ordinary painful tumour of the skin and true neuroma, I think this diagnostic symptom will be found most valuable.

I now come to Class VII, A, diseases of the bladder, Table XXV. In this class those affections of the bladder necessitating the operation of lithotomy, or the removal of foreign bodies from the bladder, are the most interesting, and, perhaps, the most manageable; for, although they are very anxious cases for the surgeon, they are more amenable to treatment than many others with which he has to deal. There is, probably, no more troublesome case to have under management than a case of nervous irritability of the bladder. Of the latter, two cases in females are to be found in these reports, and in each of them, having thoroughly satisfied myself that the condition was purely nervous, the symptoms not having yielded to ordinary remedies and there being an absence of any signs of inflammatory cystitis, I adopted a line of treatment which, I think, from its result, might be occasionally repeated with great advantage: it is simply this, that the patient being under chloroform, the urethra is notched upon its pubic aspect by a sufficiently deep incision to permit the introduction of Weiss's urethra dilator, and the canal slowly expanded so as to allow the free introduction of the index finger; in this way the whole of the interior of the bladder can be carefully explored, and if no disease of the lining membrane be detected or the existence of any foreign body, the patient is placed in bed and the case managed like an operation for female lithotomy.

In these two cases which were so treated, the urine flowed away

Table XXV.

Class VII.—A. Bladder.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Irritable	...	...	...	...	...	1	...	1	...	...	...	2
b. Cystitis	1	...	3	...	1	1	4	1	1	...	10	2
c. Prostate	...	...	...	...	2	...	3	...	2	...	7	...
d. Lithotomy	2	...	2	1	2	...	1	...	1	...	8	1
e. Do. for foreign body	...	...	1	...	...	...	...	...	...	...	1	...
f. Hæmatura	...	...	1	...	2	...	...	...	...	...	3	...
g. Vesical fistulæ	...	...	...	...	...	1	...	...	...	...	...	1
	3	..	7	1	7	3	8	2	4	...	29	6
											35	

for several days, partly unconsciously, and then shortly with slight voluntary control, and, in each instance, there was a perfect cessation of the distressing symptoms, which had previously been complained of. This operation can only be regarded as a last resource in very intractable cases, but Mr. Bickersteth, of Liverpool,* has performed a similar operation in a case of malignant disease in the male subject, where an incision was made into the bladder through the perinæum to allow a continued drain of urine, and diminish the agony of the constant contraction of the bladder. As to the danger of permanent incontinence of urine, I can only say that in neither of these cases did that result follow, and I think this must be attributed to the method I adopted of first incising the sphincter of the bladder before dilating it, by which the circular fibres of that muscle are unfolded and not torn, and will, therefore, unite more completely afterwards.

I have nothing to remark upon the general treatment of prostatic disease beyond this, that in all cases where the urine was remarkably alkaline and at all fetid great benefit resulted

* 'Liverpool Medical and Surgical Reports,' vol. i, p. 136.

from the admiuistration of the hypo-sulphite of soda in scruple doses, about four times in the twenty-four hours. It seemed to preserve the acidity of the urine, or rather to correct its tendency to undergo putrefactive change, with the evolution of ammonia, and in this way much of the irritation on the mucous membrane of the bladder was prevented. The instance of foreign body in the bladder, which was removed by the operation of lithotomy, was one in which a boy had passed a piece of india-rubber tubing along the urethra and it had fallen into the bladder. There were great difficulties in diagnosing this case, because of the softness of the material and the way in which the tube had fallen into a large semi-circular curl in the bladder, too large to be easily touched by the point of the sound, as the beak of the instrument was rotated and too pliable to give any distinct impression when so touched; I was, therefore, compelled to use the endoscope to solve the difficulty. I saw the tubing and being convinced of its presence within the bladder, I did not hesitate to operate, and soon accomplished its successful removal. The whole of this case is minutely described in the volume of the 'British Medical Journal,' for 1869.

The cases of lithotomy, nine in number, comprised eight males and one female; the latter, a girl, was admitted into the hospital on the 24th of June, 1867, with an abscess in the right *labium pudendi*. This had existed for more than three years, and was said to have grown spontaneously. A probe passed into the abscess struck a portion of dead bone, which was discovered to be on the right side of the pubic arch. Gouging was resorted to, and the sinus had nearly healed up when she left the hospital. She was again admitted on the 13th of March, 1868, the wound having never completely healed. Chloroform was administered, a deep incision was made parallel to the right labium and the right *ischio-pubic ramus*, so as to expose and allow the removal of a loose necrosed piece of bone which, from its position and shape seemed to have formed part of the upper and internal corner of the *obturator foramen*. All went on well, and the wound seemed to be healing kindly, when, eight days after the operation, the patient said the urine came occasionally in drops

through the wound. It was a long time before I could satisfy myself as to this, but at last I was convinced that there was such an escape in very minute quantities, only a few drops at a time, and, therefore, some weeks afterwards, on the 15th of May, 1868, the bladder having become very irritable, she was placed under chloroform, and I passed a probe through the sinus, thinking it might possibly enter the bladder. I then introduced the sound into the bladder, and thought I was striking the end of the probe, when, to my surprise I discovered a calculus was present. I immediately proceeded to incise and dilate the urethra, so as to pass the finger into the bladder, and then with forceps, after some difficulty, I removed a small square-shaped calculus which seemed to be composed almost entirely of phosphate of lime, but in the interior of which, on section, a small piece of bone was found as a nucleus. She made a quick recovery, the sinus healed perfectly, and I heard no more of any escape of urine, the only thing to note being that from some fault of development in the bones of the pelvis, the *tubera ischii*, were unusually close together. I have it in my notes that the space between them was not much wider than the breadth of two fingers. This case is of interest because, I believe, it is rarely that a fragment of dead bone has been found to form the nucleus of a stone, yet Sir Henry Thomson has described in one of his lectures a very similar case (*vide* 'Brit. Med. Journal,' 5th January, 1867) in a man, where after disease of the pelvis a portion of dead bone was found as the nucleus of a vesical calculus. There is not much to be said about the eight cases of lithotomy in males, except that in one—J. H—, aged sixty-one—the patient had been lithotomised a very unusual number of times. In May, 1861, the first calculus had been removed by lateral lithotomy. Ten months later, sixteen calculi were extracted by the same operation, and in about the same period afterwards twenty more calculi were taken away. About one year previous to his coming under my observation he had been operated on in the same way by the late Mr. Jordan, who removed four calculi; he recovered from that operation, and then passed spontaneously ten more calculi, of average size, which were voided per urethram, so that in various ways, partly by art and partly by

nature, before I saw this patient, he had formed and got rid of no fewer than 51 such concretions.

On March 8th, 1867, I performed upon him his fifth lithotomy and removed two calculi which weighed collectively 153 grains, they were composed almost entirely of triple phosphate, whilst the previous stones had been made up chiefly with large uric-acid centres. The man recovered and went back to the country, and I heard that he died in about 12 months from kidney disease, without experiencing any further symptoms indicative of the presence of stone in the bladder.

The next case in the descending order of age was S. C—, aged fifty-eight, upon whom I operated on the 8th of November, 1867, and removed a flat stone one inch and a quarter by one inch by five sixteenths of an inch in thickness. It was composed of uric acid; and weighed 99 grains, the man made a good recovery, leaving the hospital on the 17th of December in the same year. For three months before this operation the patient had complained of a severe fixed pain in the front half of the sole of the right foot which ceased completely after the calculus was removed. He said he believed that at the time the pain was so excessive, the stone had got bedded into the back part of the bladder; it is, I think, an interesting question to determine the cause of the pain in the soles of the feet in affections of the neck or neighbourhood of the neck of the bladder.

Professor Erichsen mentions that such pains in the feet are symptomatic of stone in the bladder, but the exact *rationale* of this symptom is not very clearly traceable, and, I think, is open to some further investigation.

The third case was that of J. K—, aged thirty-five, in whom symptoms of stone had existed for nearly six years. The urine and bladder were but very slightly affected, but he suffered so much from constitutional fever that, after sounding him, I was compelled to operate immediately, without waiting for it to subside, while the pulse was very rapid and the temperature high; this I did on the third day after the sounding, and removed a very large, heavy uric-acid calculus, which weighed 1590 grains.

He ultimately made an excellent recovery, and is now in good

health, but for fifteen days after the operation he suffered excessively from hiccup, which at first seemed to defy all treatment, but was at last beneficially affected, and then subsided under the use of large doses of quinine and hypodermic injections of morphia regularly administered. This case was operated on on the 16th of December, 1870, and he left the hospital on 4th of March, 1871.

The fourth case, I. S—, aged twenty-two years, was operated on 5th of November, 1869, when a large oxalate of lime calculus, weighing 466 grains, was extracted. He recovered and left the hospital on the 13th of December following.

Case 5.—W. B—, aged thirteen years, was the subject of a calculus. Before the operation some slight amount of albumen could be detected in the water, with a few crystals of triple phosphate. He was operated on, 1st of July, 1870, and a rough spherical mulberry calculus removed weighing 135 grains. Recovered and left the hospital on the 29th of the same month.

Case 6.—J. H—, aged eleven years, was operated on on 5th of November, 1869, and a smooth globular uric-acid calculus removed, with a thin layer of phosphate, weighing 622 grains. Recovered and left the hospital, 9th December, 1869.

Case 7.—J. G—, aged seven years, was operated on, 13th October, 1871. Small uric-acid calculus removed, covered with phosphate and weighing thirty-two grains. Recovered and left the hospital, 11th of November, 1871.

Case 8.—G. W—, aged three years, operated on, 29th January, 1869. Removed two small phosphate calculi, weighing together eighty-three grains. Was made an out-patient on the 10th of March, 1869.

These are the only instances in which I have performed lateral lithotomy during the period covered by these reports, although other cases have been performed after these dates.

In the Sub-class B of this division of my subject, as shown in Table XXVI, stricture of the urethra forms the most conspicuous item. The cases I have had of this disease I have classified as traumatic and organic, two of the former and nine of the latter, of which one died. The operations I have practised for the relief of stricture cases, beyond simple progressive dilatation, have

TABLE XXVI.

CLASS VII.—B. Urethra.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Laceration of	...	...	2	...	1	...	1	...	...	...	3	1
b. Calculus in	1	...	...	...	...	...	...	...	...	...	1	...
c. Stricture, traumatic	...	...	...	...	2	...	...	...	...	...	2	...
d. Do., organic	...	...	...	...	3	1	3	...	2	...	8	1
e. Do., Holt's operat.	...	...	...	...	6	...	1	...	1	...	8	...
f. Do., Symes' section	...	...	...	...	2	...	1	1	...	...	3	1
	1	...	2	...	14	1	5	2	3	...	25	3
											28	
C. Penis and Scrotum.												
a. Phymosis operation	4	...	1	...	4	...	...	...	...	...	9	...
b. Paraphymosis	...	...	1	...	...	...	...	...	...	...	1	...
c. Syph. ulceration	...	...	...	...	...	...	...	...	1	...	1	...
	4	...	2	...	4	...	...	...	1	...	11	...
D. Testis.												
a. Orchitis	...	...	1	...	...	...	...	...	...	...	1	...
b. Epididymitis	...	...	...	...	2	...	...	...	...	...	2	...
c. Hydrocele	...	...	...	...	...	...	1	...	...	...	1	...
d. Do., radical cure	...	...	...	...	1	...	3	...	...	...	4	...
e. Castration	1	...	...	...	1	...	...	...	...	...	2	...
	1	...	1	...	4	...	4	...	...	...	10	...

been Mr. Holt's operation and Mr. Syme's perineal section; of the former I have had eight cases, all of which proved successful. In some of them I observed that curious symptom urethral fever, the true nature of which is so difficult thoroughly to explain; for its treatment I have used quinine and opium, according to Mr. Holt's method, with great success. The form of stricture

which is best suited, in my opinion, for this method of treatment is that which may be called the short and annular, as distinguished from the long and tunnel stricture of some writers. I have applied it to confirmed chronic cases of stricture, even where their origin has been traumatic, and with equal success; but inasmuch as the changes induced in this variety of stricture generally extend over a longer portion of the canal than would exist in the annular stricture, they are the cases, I think, which are the most suitable for Mr. Syme's section. In either of these two radical cures of stricture it is of the greatest importance to study beforehand the condition of the constitution, and specially in reference to the presence or otherwise of organic renal disease. If this be overlooked, or not attended to, it will be one great cause of fatal results. The one case of Mr. Syme's section which proved fatal, out of the four here reported, was in a man reduced to a very low state of health by the presence of numerous fistulæ, indicating that the urethra was extensively damaged. He had, in previous years, passed much of his life as a soldier in hot climates, where, I have reason to believe, he indulged largely in intemperate habits. All went on well for a few days after the operation, and then there was some difficulty, after removing the catheter, in re-introducing it, and it was soon after doing this that he had the first attack of rigors. These were repeated almost periodically, three and four times in the twenty-four hours, the man remarking that they resembled very closely the violent attacks of ague which he had experienced in some parts of India. Certainly, the phenomena were exactly similar to those I have observed in ague under ordinary circumstances, only immensely intensified; the cold stage, the stage of heat, the profuse perspiration, were all well marked and seemed to follow each attack in a very regular and definite course. Large quantities of quinine were administered, with moderate doses of opium, and they seemed to keep the rigors in check, so that for some time, I hoped, there might be some deeply seated abscess, or possibly some collection of matter in the neighbourhood of the neck of the bladder, which might, as is sometimes the case, lead to this form of irritative fever. Such, however, was not the case, and at last uræmic

symptoms showed themselves, too clearly indicating, that either the urethral disease had extended to the kidneys, or that the latter organs had been themselves the subject of previous disease; the man died comatose on the sixtieth day after the operation.

In the next Sub-class (C) I have placed diseases of the penis and scrotum, as shown in the same table. I have only one case of syphilitic ulcer to refer to, because it is a rule of our hospital that such cases are not admitted under ordinary circumstances, they being regarded as proper subjects for our Lock Hospital. Hence it is that, except amongst the out-patients, our experience in the treatment of acute syphilitic diseases is very limited. This case, however, was a very peculiar one; it occurred in a married man, aged sixty-seven years, who resided at some distance, in the country, and when he presented himself in the reception room the appearance of the ulcer on the penis was, to a superficial observation, precisely that of epithelioma. On the left side of the penis, near the middle, there was an oval sore, quite superficial and very defined, with hard and jagged outline, with sharp, scarcely excavated edges, and lying upon it a scab of hardened secretions, from beneath which a serous discharge flowed, somewhat of the character we see in some forms of lupus. Soon after his admission, when the surface of the sore had been cleaned by emollient applications, the edges assumed a rather more defined outline, and, the fungous granulations being somewhat arrested, I charged the man with the possibility of his having been exposed to syphilitic inoculation. This, however, he indignantly denied, and he was so confident I was mistaken that I did not press the question, but represented the facts to our medical consultation, when the whole matter was well discussed, and it was agreed that the sore must be regarded either as an example of large, oval, soft chancre, or else some form of rodent ulceration of the part. On each side there were several small indolent inguinal glands, more numerous rather, on the same side as the ulcer. I therefore suggested, that the best way to solve the problem would be to submit the man to auto-inoculation. This being resolved upon, on the 17th of December, 1869, I inocu-

lated him with a small quantity of the purulent serous discharge from the surface of the sore on the penis, by means of a lancet, as in the plan of ordinary vaccination, on the front and internal side of the right thigh, the side opposite to that on which the ulcer of the penis was situated. On the 18th it is reported—"Spot looks a little red, but almost as if from a scab of coagulum. 19th.—Can just detect a little sero-purulent vesicle with hemispherical projecting surface. 20th.—With lense, can now see the scab formed of dried secretion, which is separating at the edges, under which an excavating sore is in process of formation. 21st.—The spot is larger, the scab more adherent and more extensive, with red blush all round. He still adheres to his original story that he has not had any primary syphilitic inoculation, yet he says, '*If he has had it*, it must have been caught by contagion!' 22nd.—More distinct pustulation, but no separation and no further excavation." To-day it was decided to treat the case as one of syphilitic ulceration; black wash with opium was applied to the sore, and a quarter of a grain of iodide of mercury was given three times a day. On the 26th, when he had taken about nine of these pills, there was a slight improvement, both in the sore on the thigh and in that on the penis. On the 29th it was reported, both the sores are rapidly healing. On the 30th he was again shown to the consultation, and it was quite evident, the sores were specific, and that the treatment ought to be continued. On the 31st he was made an out-patient for a month, and told to continue the pills for a week, then, for a second week only twice a day, and for another week once a day, and to have internally a mixture of the citrate of iron and quinine. The ulcer on the thigh and the one on the penis were both healed in rather less than five weeks from the commencement of the mercurial treatment. This may be looked upon as an interesting case, on account of the inoculation being made so directly a means of diagnosis, the patient having so positively denied the possibility of any specific contagion.

In my cases of phymosis, of which I have to report nine, five in adults and four in children, I have varied the operations from the simple slitting up of the prepuce to complete circumcision; but after much consideration of the subject and trying various forms

of incision I have come to the conclusion that, for adults, the best kind of operation is that which, I believe, is generally called Cloquet's method. It consists in a simple longitudinal division of the prepuce close to, but on one side of, the frænum, at the under part of the penis. This, provided the mucous membrane be sufficiently divided, and our opinion as to the advantages of this mode of operating, be delayed until all healing has been accomplished, and all œdema has subsided, will, I believe, be found to be in every respect a better kind of operation than the superior longitudinal cut. Still, I would not pledge myself to any one special form of incision, although, certainly, from the experience I have had, I give the preference to Cloquet's method.

In the Sub-class D are placed diseases of the testes and the operations required for their relief. I have only here to mention that in the radical cure of hydrocele I have generally employed iodine in some form, either as an undiluted tincture or mixed with water, and, this failing in one case, where the hydrocele sac had been very large, I repeated the operation, but varied it by using pure port wine in sufficient quantity to distend the sac and touch every part of its interior. The result was in every way satisfactory.

In private practice, where we are, perhaps, disposed to give preference to operations attended with a minimum amount of pain, even if not so certainly successful as the more severe ones, I have found the port wine treatment far superior to the iodine. In the latter, however carefully we may try to get the fluid to touch every part of the sac, on account of the pain produced to the patient, we are apt occasionally to fail in securing a perfectly successful result, and it is occasionally necessary to repeat the operation a second time. Now, with the port wine plan, old as it is, and much as it may be regarded as a vestige of antique surgery, I have found it invariably successful, and have used it, after iodine had failed, in more than one case, besides the one I have mentioned. The secret of success consists in thoroughly distending the sac of the hydrocele, by first noting the number of fluid ounces of serum which is drawn off, taking care, if possible, to inject in place of it at least one ounce more, of port wine, so as

thoroughly to fill the sac; the fluid thus injected may be regarded as an alcoholic solution of astringent matter and should touch every part of the secreting surface. This can be done with very little pain, and yet subsequently cause a degree of inflammation sufficient to destroy the secreting power of the membrane, without the risk of sloughing or suppurative inflammation.

Among the operations for the removal of the testis, I have one case to remark upon, which I believe is not very common, in which the testicle was removed, not for strumous, but for syphilitic ulceration, with suppurating fungus. The history of the case showed clearly that the man had passed through all the stages of syphilis, and for some time the testis had presented the character of an ordinary syphilitic sarcocele. Then an abscess formed, and either burst or was opened by the surgeon in attendance, and a fungous growth protruded with a tightly bound band of tissue around its base. This had been treated for many months by local applications and anti-syphilitic remedies, but the patient himself was so anxious to get rid of the trouble and annoyance of the disease that he came into the hospital for the special purpose of having the testis removed. How far, being of specific origin, it might have been healed by longer perseverance in constitutional treatment alone, I am not in a position to state.

In Table XXVII, I have made three sub-classes :—E, diseases of the breast; F, ovarian diseases; G, diseases of the uterus, &c. Of the cases of malignant diseases of the breast, in the female, which I have had under treatment, two were so far advanced, and the surrounding tissue so infiltrated by the disease, that no operation was attempted. In ten cases, however, of scirrhus, and in five of carcinoma, the operation for the removal of the entire breast was performed, and all these fifteen cases so far recovered as to leave the hospital with the wounds very nearly, if not completely, cicatrized; their after-history, I regret to say, is not known to me with certainty except in one instance, the leading points of which were somewhat peculiar.

I may here remark that much is lost in the value of statistics of such operations as these, in hospital practice, by reason of the

Table XXVII.

Class VII.—E. Breast.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Abscess	...	...	...	...	...	4	...	...	...	...	...	4
b. Fibroid rec.	...	...	...	...	...	1	...	...	...	...	...	1
c. Scirrhus	...	...	...	...	...	...	...	2	...	...	...	2
c. Do., operation	...	...	...	...	...	1	...	8	...	1	...	10
d. Carcinoma, operation	...	...	...	...	...	...	...	5	...	...	...	5
	...	...	...	...	...	6	...	15	...	1	...	22

F. Ovary.

Ovarian tumours	.....	.....	.....	.....	.....	2	...	.....	.....	... 1	.....	2 1
Ovariotomy	.....	.....	.....	.....	.....	4	...	.....	... 1	.....	.....	4 1
	.....	.....	.....	.....	.....	6	...	.....	... 1	.....	... 1	.....	6 2 (8)

G. Uterus, &c.

a. Prolapsus, &c.	...	...	...	1	...	2	...	3	...	...	...	6
b. Tumours	...	...	...	...	...	2	...	2	...	...	...	4
c. Vaginal fistulæ	...	...	...	...	...	1	...	...	...	...	...	1
d. Cancer	...	...	...	...	...	...	..	2	...	1	...	3
e. Contusion of vulva	...	...	...	...	...	2	...	...	...	...	...	2
	...	...	...	1	...	7	...	7	...	1	...	16

extreme difficulty we have in following up the cases after they have once passed from under our care. In the practice of our hospital a great number of the patients come from long distances, and often leave behind them incorrect addresses; if written to about their cases they very rarely reply, or neglect to send, if so requested, periodical reports of their condition, so that for any

attempt to determine how many of these cases have survived the operation, either for the average time, or for a longer period, my information is very imperfect. In private practice it is otherwise, and it is from following out those cases that we are better able to judge of the real prospective advantages of operations in malignant disease. The interesting case referred to above, and of which I have now to speak, was that of a woman, A. G—, aged sixty-six, a nurse by employment, and for one year previously a widow, having had eight children, the youngest twenty-two years of age. She applied for admission on account of pain and enlargement in the glands of the axilla on the right side, and said that in her last confinement she had an abscess in each breast, and was obliged to desist from suckling her child. On examining the breasts I found both nipples pretty equally retracted. In the right breast, which was examined most carefully, no hardened mass or new growth could be in any way detected, although, the patient being very stout, it may have been overlooked. At any rate it seemed almost as if the disease was at that time confined entirely to the axillary glands; the pain was excessive, and the woman very willing to submit to any operation. When placed under chloroform I proceeded deliberately to dissect out by a not very deep but long incision the whole mass of enlarged glands from the axilla. In this operation I had the good fortune to have the able assistance of the late Mr. Beever, whose skill and coolness in severe operations are known to all who have witnessed the practice of our infirmary. He helped me greatly in what was a very tedious operation, the axillary vein being laid bare for fully an inch and a half of its length, and we had good reason to believe that the whole of the disease had been taken away. The operation was conducted as nearly on antiseptic principles as was possible in those early days of practice; antiseptic ligatures were used, the wound healed very satisfactory, and in one month and two days, after the operation, she left the hospital, with the wound well cicatrized except in one small place. One symptom remained; she had a curious numbed sensation along the palmar branch of the right ulnar nerve, which extended to the dorsal aspect of the hand along the same track of

nerve. She went to Southport, and remained there for some time apparently in every way quite well, but at the end of eight weeks from the closure of the wound again presented herself at the hospital, and complained bitterly of a severe pain in the right breast, where I could feel distinctly by deep pressure a nodule of hard tissue, deeply situated in the sternal half of the breast. The line of the cicatrix was quite soft except just in front, and here there was a tubercle which had a somewhat black, almost melanotic, appearance. From the patient's testimony as well as from my own observation I was inclined to think that, all that was now to be felt in the breast had grown rapidly since the closing of the axillary wound. I therefore proceeded to remove the whole of this breast, which I did in the usual way by a very free elliptical incision; the wound healed equally well with the former one, and in about five weeks it was completely cured. When the axillary glands and the hard tumour removed by the second operation were examined under the microscope, there was distinctly visible in them an abundance of double nucleated cells closely packed together in a hardened stroma. Now, this patient has been under my frequent observation from the end of July, 1868, when the first operation was performed, until the present date, more than five years, she is in excellent health, both cicatrices are quite soft, there are no longer any pains as the result of nerve pressure, and if the tumour in the breast or the glands in the axilla were malignant the disease must have been in a dormant, not really active, stage, and the early removal of the local disease has checked the general contamination of the system.

In ovarian tumours I have to report three cases in which it was not thought proper to attempt any operation, and five cases in which ovariotomy was performed. Of the latter four recovered, and one died three days after the operation, from peritonitis. In one out of the four cases a large cyst in the tumour was the subject of extensive suppuration, and at the time of the operation I found it impossible to remove it. I followed, therefore, the plan advocated by Mr. Bryant for such cases. I did not disturb the adhesions which surrounded the tumour on its anterior aspect more than I could avoid, but making a free incision into the cyst,

I let out about five and a half pints of purulent fluid, then enlarged the incision to fully three inches, fixing the edges by sutures to the sides of the wound in the abdominal wall, and stuffed the interior with strips of lint. The lint was removed the next day, the cyst was washed out with a weak carbolic-acid lotion, and from day to day it slowly but surely contracted, and the whole of the tumour gradually collapsed. Although the patient suffered from a fistulous opening for many months, in which it was necessary to use a wire-drain tube, at last this closed up, and she made an excellent recovery, with nothing to be detected through the abdominal wall but a general thickening of tissue about the breadth of the two recti and half their length. In each of the other cases where the tumour was removed Mr. Spencer Wells' semi-circular clamp was used, and every precaution taken to avoid, both at the time of the operation and subsequently, putrescence in the dressings, and pyæmic inoculation. The patients in these four cases of recovery are now living, or were so within a few months of the date of this report.

Among the diseases of the uterus I have only to mention one case of polypus removed without difficulty by Dr. Aveling's uterine *polyptrite*, from the right side of the cervix; the stalk of the polypus was very firm and nearly an inch and a half in diameter, yet it was cut through without difficulty. The case seemed to go on satisfactorily, and she was allowed to leave the hospital about fourteen days after the operation, all discharge having ceased, and, as far as could be determined by tactile examination, the stump of the polypus had entirely healed. Whether she got some chill or cold on her journey home or not I cannot tell, but I afterwards heard that she suffered for many weeks from inflammation of the lymphatics on that side, with all the phenomena of the white leg of lying-in women of the older authors, from which, however, she ultimately recovered.

In two cases of prolapsus, or rather *procidentia uteri*, I operated for the relief of the deformity with good success. One has proved to be a very interesting case, as I have been able to follow its after-history for a longer period than usual. E. W—, aged eighteen, unmarried, had suffered from entire procidentia uteri for about two

years, and she had previous to that period been subject to epileptic fits. It is supposed that from the convulsive efforts she made in one of these attacks, the uterus became prolapsed, and the displacement was increased by her occupation as a weaver in a factory, where she had to stand many hours each day. The uterus was entirely procident, and could not be kept within the pelvis by any of the mechanical appliances which had been used; therefore, on the 21st of April, 1871, the patient being under chloroform, I passed two fingers into the rectum, and forced down the tumour as far as possible, so as thoroughly to distend and unfold the everted vagina. The fingers of an assistant were then substituted for my own, and in this way the uterus was kept firmly fixed and thoroughly prolapsed during the operation. I then dissected off a very large piece of mucous membrane and some of the submucous tissue of a triangular form, its apex being nearest to the orifice of the vagina, each of its three nearly equal sides measuring fully two and a half inches, and the front angle being somewhat rounded. This being done, thirteen catgut sutures were made to traverse from the edges of the wound entirely across the exposed surface in parallel rows. Then, after all bleeding and oozing of fluid had ceased, which was expedited by touching the surface freely with spirits of wine, I proceeded to tighten up the ligatures one after the other as the tumour was slowly returned into the vagina, the suture nearest to the orifice being the last to be tied. The after-treatment consisted in gently syringing the passage with a weak solution of Condy's fluid twice or thrice daily. I had no further trouble with the case, and saw no more of the sutures, which most likely dissolved away after having served their purpose. At the end of a month I made a digital examination, and found the uterus in a good position, and the vagina so far contracted as almost to be in the normal virgin state. The patient was directed to use a weak astringent lotion of zinc and alum from time to time, and to report progress. I saw her once or twice after this during the succeeding six months, and there was not the slightest return of the prolapsus. I have heard recently that, rather more than a year since, she was married, and within the last few weeks she has given birth to a living child

and done well, without any displacement of the uterus or other disturbance.

Class VIII, Sub-class A, is devoted to such cases of injuries and diseases of the eye as have been under my treatment in the hospital during the period over which these reports extend. As will be seen by Table XXVIII, they are not very numerous, and in no case have I to mention any special points of interest. With regard to diseases of the eye generally, I may quote the words of a writer on operative surgery well known to the profession, who says—"This subject has now become so special, and so much has lately been done in it, that, in the absence of any great personal experience, I gladly refer the reader to the admirable works we possess." So I may say with reference to diseases of this organ, that the cases here noted down have been forced upon my attention more by circumstances over which I had no control than by any special selection, and they are cases which, under the regulations now in force at our hospital, would be handed over to our recognised oculist.

In Sub-class B, in which I have placed affections of the ear, I have only to mention two cases—one of congenital deformity, and one of carcinoma. The congenital deformity was of special rarity, and I related the particulars of it minutely in the Physiological Section of the British Medical Association, at Oxford in the year 1868. It consisted essentially in a displacement of the external ear and those parts which seem to grow in harmony with it; for, situated on the left side of the face, near to the middle of the cheek, was a well-formed auricle, and at the spot where the external meatus ought to be placed was a slight depression in the surface of the skin, beneath which could be felt a hollow in the position of the absent zygomatic process, and the imperfectly formed articulation of the temporo-maxillary joint. The vertical, and part of the horizontal, ramus of the lower jaw of the same side were but slightly developed. Of course, there was no power of audition on that side. The opposite side of the cranium and face were quite natural, but the left commissure of the lips at the angle of the mouth was extended backwards for about half an inch, forming, in fact, a sort of hare-lip fissure at this particular part of the oral aperture. The

Table XXVIII.

Class VIII.—A. Eye.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Injury to orbit ...	...	...	...	...	1	...	...	...	...	...	1	...
b. Tumour on eyelid	...	...	...	...	...	...	1	...	...	...	1	...
c. Pannus cornea ...	...	...	...	...	...	...	1	...	...	...	1	...
d. Iritis, specific	...	...	...	...	...	...	1	...	...	...	1	...
e. Iridectomy for glaucoma	...	...	...	...	1	...	...	...	...	...	1	...
	...	...	...	...	2	...	3	...	...	...	5	...

B. Ear.

a. Congenital displacement.....	...	1	...	...	...	...	...	...	...	...	...	1
b. Carcinoma auriculæ	...	...	...	...	...	...	...	...	1	...	1	...
	...	1	...	...	...	...	...	...	1	...	1	1
											2	

C. Nose.

a. Lupus	...	...	...	...	...	1	...	...	...	...	...	1
b. Ozæna.....	...	...	...	...	1	...	...	...	...	...	1	...
c. Polypus	...	...	...	...	...	2	...	...	...	...	...	2
	...	...	...	...	1	3	...	...	...	...	1	3
											4	

friends of the patient—a little girl, aged two and a half years—were very anxious that something should be done to remove this conspicuous deformity. The child was therefore put under chloroform, and I proceeded carefully to dissect off this misplaced external ear; in so doing, I was surprised to find that while the cartilage itself was well formed and very nearly as large as the external ear of the other side, there was attached to it a ring of bone, the tympanic bone of the ear. When these two structures had been removed and carefully examined I found in them a *membrana tympani* and the process of the *malleus;* showing that there had been at some particular period of early intra-uterine growth a misplacement of the primordial cell from which these parts ought to be evolved, and suggesting the idea that, under ordinary circumstances, the external ear, the tympanum, and some of, if not all, the ossicles, are developed from the same centre, which, in this particular deformity, had wandered from its normal position. These facts must be regarded as possessing great physiological interest in relation to embryology. The wound thus formed on the cheek was well supplied with blood, and two very small arteries deeply buried in the cartilage gave some trouble, yet it healed very well and left but a slight scar. I have repeatedly seen this child up to within a few weeks past, and it seems that now, after just five years (the operation was performed on the 9th of December, 1867) the developmental force has so far exerted itself upon the left half of the face and cranium as to remedy very considerably the disproportion of these parts. Yet there was one difficulty which had to be overcome, viz. a tendency for the left cheek to become adherent to the gums of the upper and lower jaw. These I have on three occasions divided, placing between them a silver plate, and more recently a flattened oval ivory plug, which latter instrument has answered the purpose excellently, and the child has now a very good, useful supplementary cavity on this side of the mouth.

The case of carcinoma of the external ear (which is not a very frequent seat of cancer) is one of the only two cases I have seen, and the chief peculiarity to mention in it is that the carcino-

matous or, perhaps I might say, the epitheliomatous ulceration, although commencing in the free portion of the auricle itself, had, when I saw the case, extended to the temple and the skin over the mastoid process, so that to attempt to remove the whole of the diseased structures was impossible; and as a great portion of the auricle had been destroyed by the ulcerative process I was content to apply strong nitric acid to the whole surface, with the hope of destroying it and checking the progress of the disease. I employed this caustic because it was said that from the first the ulceration had been attended with frequent arterial hæmorrhages. It did very well, but the man would not remain in the hospital and only came from time to time to show himself. He was under observation for nearly three months, after which he ceased to attend as he lived a long way in the country, and I heard from his friends that constitutional cachexia suddenly set in, from which he died in a few months. He was sixty-three years of age, and up to the very last frequent and very excessive arterial bleeding recurred, the blood, on many occasions, spurting out suddenly, to the distance of several inches from the surface, in a continued stream.

In Sub-class C, *a*, lupus, I had one case upon which I have simply to remark that, as far as the temporary arrest of the progress of the disease was concerned, considerable benefit seemed to be derived from the application of the undiluted *Liquor Fowleri* to the ulcerating surfaces. The same preparation was also administered internally in three minim doses, with drachm doses of the syrup of the iodide of iron, but as the case passed from under my observation, I can only speak of what appeared to be of temporary service.

In the cases of ozæna (*b*) from diseases of the bones of the nose, most likely of a specific nature, the patients gained much relief by using a modification of Dr. Thudichum's nostril douche, which I contrived by simply having a small tin vessel, which would hold about a pint, so fashioned as to hang steadily against the wall on a nail, and connected to the lower part of this reservoir a piece of elastic tubing with a tap, and beyond this a tube of wood suited to fit the nasal aperture. All things being arranged, and the patient holding his face well over a basin, the

mouth being kept widely open, the tap is gently turned and the fluid in the douche, which is generally water slightly medicated by some saline matter, as Condy's fluid, or some weak solution of nitrate of lead or carbolic acid, is allowed to well up the nostril very slowly until at last it fills the cavity, and passing across the septum of the nostrils comes down the other side. In this way the current of fluid can be directed up or down either nostril with ease, and there can be no better method designed for cleansing the diseased surfaces. It was not until I had read Dr. Thudichum's paper on the treatment of these affections of the nose, that I knew that so valuable a practical application could be made of the physiological fact discovered by E. H. Weber, of Leipzig, before 1842, and referred to by Dr. Thudichum, that it is possible, under certain conditions, to send a stream of water up one nostril and down the other, without any portion of it passing either into the pharynx or the mouth.

In polypus of the nose (*c*) I have had two cases in hospital, one a very large polypus in the right nostril, in a woman, aged thirty years, who had suffered from the disease for more than two years, and on whom several attempts had been made to remove the mass, which was of fleshy hardness, by the forceps and by a partial division of the ala of the nostril. When she came to the hospital I placed her under chloroform, and made such an incision through the upper lip into the floor of the nostril as would be required for the removal of the upper jaw, according to Sir W. Fergusson's method, and by this means, having got a good view of the position of the polypus, I had much difficulty in exposing its attachments, which I found sprang from the anterior edge of the opening of the antrum; for, at first the hæmorrhage was very considerable, almost irrepressible, and each time the surface of the polypus was touched the part was deluged with blood. Having made one or two attempts in this way to get hold of the base of the polypus, so as to pass round it a ligature or wire écraseur, it occurred to me, whilst operating, that Dr. Oldham, many years ago, had made the important statement that in uterine polypi the most frequent source of hæmorrhage is from enlarged veins just beneath the mucous covering which contains

them, and not from the centre of the mass. Acting upon this idea, I immediately proceeded to slice off a large portion of the polypus, under the conviction that when I came to the centre I should not have more, but, perhaps less hæmorrhage than when I dealt only with the surface. This proved to be correct, for after taking away two or three large pieces, I saw exactly the base of the mass (which before had been hidden from view, being closely jammed in between the expanded bones), I then cut it through with the scalpel, and, contrary to what might have been expected, the hæmorrhage immediately ceased, the only bleeding that really occurred being from the walls of the great cavity which was thus exposed. The whole of the polypus so removed was fully equal to the size of a large goose-egg, being three and a half inches long and two inches wide transversely; the attached portion was the narrowest part. The interior of the nostril was then dressed with a solution of the perchloride of iron on strips of lint, which were so arranged that they could be pulled out through the nose. The divided edges of the lip were restored to position by hare-lip pins. The woman rapidly recovered, except that for some time after she suffered from obstruction in the left nostril from the septum having been pushed over completely to that side, but this was corrected by the use of an ivory plug. I saw her about six months afterwards, and she was then perfectly well, having had no return of the disease.

In the other case, in which there was also a polypus in the left nostril, but not nearly of the same extent, when the patient applied to me at the infirmary it was for obstruction of the left lachrymal duct, with much epiphora, which I soon discovered was due to the polypus distending the nostril and closing the duct. There were several polypi, a few of which were of large size. Some I removed with the torsion forceps, and others I cut through with Marshall's scissors. In this way, after three operations, I completely emptied the nostril, and then a new feature showed itself, for about this time the woman directed my attention to a small abscess at the nasal extremity of the left eyebrow. When this was opened and a probe introduced it was found that a portion of the frontal bone was necrosed, and it was a long time before by one

or two operations of gouging it out that the sinus could be closed. I think in this case some portion of the polypus must have been pressed into the frontal sinus, and, by interfering with the nutrition of the wall of that cavity, led to the death of the bone, and although she could at no time force air through the sinus beneath the eyebrow, yet a probe could be passed nearly an inch and a half horizontally across the middle line quite in the direction of the sinus itself. She, also, at the end of nearly eighteen months, had a good recovery.

In Sub-class D is recorded, as shown in Table XXIX, a case (*b*) of abscess of the tongue, which occurred in a man, by occupation a coachman, aged twenty-seven, who had suffered from swelling of the tongue on the left side for nearly a week previous to his admission into the hospital, when the tongue was of immense size; he could, however, swallow fluids. The swelling was chiefly situated on the left side, and when I saw it there was an obscure feeling of fluctuation. After a few hours this increased, and in the middle of the night the abscess fortunately burst about the centre of that side of the tongue. More than a fluid ounce of matter was expelled, and when I looked at it next day the tongue was nearly reduced to its natural size. It was very curious to observe how completely the abscess was confined to one side of the tongue only. This is the only case of the kind that I have seen; it healed quickly, and the man went out well. He could not give any account at all as to the possible cause, and there was nothing in the condition of the teeth or gums to explain it.

In division *c* I had an interesting case of a very large ranula, in a boy, aged fourteen years, which had been tapped through the mouth on several occasions before he came under my notice. This I treated with four silk setons passed through its wall beneath the tongue, and thus set up suppurative inflammation. Although as soon as the inflammation increased I removed one seton day by day until only one was left, yet the irritation ran on to so high a degree that an abscess formed beneath the jaw, which I was compelled to open, and in this

TABLE XXIX.

CLASS VIII.—D. Mouth, Palate, &c.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Hare-lip	1	3	1	...	...	...	...	...	...	...	2	3
b. Abscess of tongue	...	...	...	...	1	...	...	...	...	...	1	...
c. Ranula	...	...	1	...	...	...	...	...	...	...	1	...
d. Epithelioma of lip	...	...	...	...	...	...	...	...	2	...	2	...
e. Do. of tongue	...	...	...	...	...	...	1	...	...	...	1	...
f. Epulis	...	...	...	...	...	1	...	...	...	...	...	1
g. Cleft palate	...	1	...	...	...	...	...	...	...	...	...	1
h. Tumour of palate	...	...	...	...	...	1	...	...	...	...	...	1
i. Ulceration of fauces	...	...	...	...	1	...	...	...	...	...	1	...
k. Strict. œsophagus	...	...	...	...	...	...	...	...	1	...	1	...
	1	4	2	...	2	2	1	...	3	...	9	6
											15	

E. Larynx and Trachea.

a. Specific ulceration	...	...	...	...	...	2	...	...	...	...	...	2
	...	...	...	...	...	...	...	...	...	...	...	...
b. Tumour	...	...	...	...	...	...	1	1	...	...	1	1
	...	...	...	...	...	...	...	...	...	...	...	...
c. Tracheotomy	1	...	...	...	...	...	1	...	...	...	2	...
	...	...	...	...	...	...	...	...	...	...	...	...
d. Cut throat, suicid.	...	...	...	...	...	1	1	...	1	1	2	2
	...	...	...	...	4	1	...	...	...	...	4	1
	1	...	...	...	...	1	2	...	3	...	1	...	1	1	5	2	3	...
	...	...	...	...	4	1	...	...	...	...	...	...	...	...	4	1	...	...
															9	3	3	...
															15			

way, although not wishing to do so, formed a second opening, which I feared might lead ultimately to a salivary fistula. This, however, I am able to report was not the case, for rather more than a month afterwards the whole of the cavity of the ranula, which at one time would have held nearly two ounces of fluid, closed up, and the boy was discharged cured. I mention this because I have recently had a very similar case in which the same fear was entertained that the external opening might become fistulous, but fortunately it did not.

In division *d* (epithelioma of lip) I have had two operations in hospital, both on the lower lip, and the only peculiarity to note is that I adopted the plan of dressing which I first saw employed by Dr. Joseph Bell, of Edinburgh; this is to use the uninterrupted suture for bringing the edges of the wound together, instead of hare-lip pins, and to apply nothing whatever to the surface afterwards—neither collodion, dry lint, plaster, nor any other protection—but, to depend entirely upon the hardened crust of coagulated blood which may form just over the line of union of the wound. This method is much superior, as far as comfort to the patient is concerned, to the plan of using pins, and, as far as I have yet seen, is in every way an improvement.

In Sub-class E, *c*, are the cases in which tracheotomy was performed. They are two, one of which was in an adult, aged forty-nine, for tumour on the side of larynx, displacing it, and producing excessive dyspnœa. He was greatly relieved by the operation, and left the hospital in about three weeks to go into the country, but I subsequently heard that, although he wore the tube to the end of life, he sank six months after leaving the hospital from the increase of the tumour, which was unmistakeably of a malignant character. The other case was in a little boy, aged six years, brought into the hospital for attacks of dyspnœa, caused by a small piece of the shell of a periwinkle having been drawn into the trachea, and down into the branch of the left bronchus, from which I presumed it was occasionally displaced and in some way led to spasmodic closure of the rima, for it was found on auscultation that in the upper one third of the left lung

all respiratory murmur was absent. Tracheotomy was performed; he went on favorably for eight days, when suddenly, in a spasmodic attack of coughing, the foreign body was dislodged, and respiration was again heard equally in every part of the chest, and the little patient recovered.

In Sub-class E, *d*, I have placed those cases of cut-throat and injury to the larynx which were suicidal in their nature. They are nine in number, and all in the male sex. In five of these the immediate cause was clearly traceable to drink, or the depression which followed in its train, and one of them was fatal. The other four were in persons who in some way, previous to the act, had shown indications of insuperable mental depression due to disease, and two of these died. Thus, out of the nine cases there were six recoveries and three deaths. One case is especially deserving of note, as the incision made by the unfortunate subject was of such a nature as to expose completely, by a transverse cut across the thyroid cartilage, just above its lower edge and in a direction upwards and backwards, a view of the arytænoid cartilages and the true vocal cords. I saw the patient shortly after his admission into the ward, and, his head being thrown backwards, the whole mechanism of the vocal apparatus was brought into view, presenting such a perfect picture as no laryngoscopic mirror ever reflected. It was deeply interesting, although sad, to watch how, in his attempts to speak, and in the production of such words and sounds as could be articulated without the help of the tongue and lips, the vocal cords were played upon with marvellous rapidity by the muscular apparatus of which they are the servants. This continued only for about four hours, when the man, in spite of all efforts to support him against the shock his nervous system had received, sank from sheer exhaustion.

In Sub-class F, Table XXX, are placed diseases of the rectum. Here there were three cases of hæmorrhoidal tumours in which ligatures were applied with perfect success, but in another case, where the man was of very intemperate habits and there were symptoms of early phthisis, I did not venture upon any operative interference.

Table XXX.

Class VIII.—F. Rectum.

	Under 10 years.		Under 20 years.		Under 40 years.		Under 60 years.		Over 60 years.		Total.	
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.
a. Condylomata			1								1	
b. Hæmorrhoids					1						1	
b. Do. ligatured					1		2				3	
c. Abscess near			1		1						2	
d. Fistulæ						1	1				1	1
d. Do., operation			1		3	2	2				6	2
e. Malignant disease						2	1				1	2
			3		6	14	6				15	14
											20	

In division *d, fistula in ano,* or rather *fistula recti,* I have had eight cases of operation, which have all done well; and two in which I did not operate, one of them being a case of active phthisis and the other in a gentleman in broken-down circumstances, who came into the hospital with many sinuses left near the anus from previous operations for fistulæ. In this case the disease seems to have been brought on by injury to the soft parts, or possibly the bones of the pelvis, caused by riding on horseback without saddle, exposure to the weather, bad food, &c., and after being in the hospital for some weeks, and only partially relieved by the use of injections, enemata, good food, and tonics, he sank from coma, the result of disease in the kidneys. In this case I was deterred from making an attempt to divide any of the fistulæ, by special information I received, that on previous occasions he had shown such a great tendency to the hæmorrhagic diathesis. I consequently thought the operation would be attended with unjustifiable risk, the ultimate benefit being so very uncertain.

With regard to the operation, or rather the after-treatment, in cases of *fistula in ano,* I have only one practical remark to make

and that is, that I have found it a very useful plan, as a rule of practice in all cases (if possible), when the patient is pronounced cured or nearly so, to pass the rectum speculum into the bowel with the fenestra towards the line of the incision of the fistula, examining carefully the whole length of the wound by using a probe curved into a hook, which, being passed up the bowel within the speculum, can be drawn down to ascertain positively that no pouch of unhealed tissue remains, opening upwards into the bowel, and closed towards its cutaneous extremity. This, I believe, when neglected, often leads to difficulties in these cases, for there is such a great tendency for the track of the fistula to heal where it joins the skin rather than the mucous membrane, and such pouches frequently remain for a long time and form the cases in which it is said the patient has been operated on for fistula without success. Sometimes, the blunt-curved probe will break down the newly formed tissue and fully open the pouch, and in this way a more perfect cicatrix will be formed, or it may be needful to use the guarded, cutting, hooked knife which I have described as specially suited for cases of internal blind fistula.

In division *e*, I had one very distressing case of malignant disease of the rectum in a young woman, aged twenty-six, in whom it advanced very quickly, and I had the opportunity of noting how the stricture of the bowel which accompanied it was caused by the constant disposition malignant deposits have to contract in some of their forms, as, for example, in the retracted nipple of the cancerous breast, for in the case to which I refer, within five weeks of my first examination, the malignant mass around the bowel had diminished the calibre of the canal from that which would permit the free passage of the finger to a circle little less than a quarter of an inch in diameter. It was a case in which, had the patient been willing, I should gladly have performed colotomy, but she preferred to go home rather than submit to any such treatment, and in a very few weeks she died. It was the most rapid case of this fearful disease that I have ever witnessed.

Here I must bring to a conclusion this superficial account of "Five Years' Surgical Work in the Manchester Royal Infirmary."

It would have been possible, if time and space had permitted, to have expanded the subject much more completely, and to have related in detail many other cases of considerable interest. But, I trust, what I have now written will induce other workers in the field of practical, and scientific surgery, to undertake a similar task, that we may be able to compare the work done here with that in other hospitals over an equal period, and thus illustrate the utility of following out some "ready method of recording surgical cases in hospital practice."

ON SOME CASES OF CONTRACTED BURN CICATRIX TREATED BY THE TAGLIACOTIAN OPERATION.

By JAMES HARDIE, M.D.,
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The following cases are published as a contribution to the art of remedying the deformities of contracted cicatrices, and more particularly as showing the perfect practicability of a well-known procedure, which, it appears to me, is not sufficiently appreciated by modern surgeons. I have no wish, however, to claim for this procedure as applied to such cases any superiority over other methods of treatment, because, in the first place, I can scarcely say that I have had experience of these methods; and, in the second place, because numerous cases are on record in which, though treated in various ways, equally good results are said to have been obtained. Earle,* for example, revived the method of complete removal of all cicatricial tissue, allowing the resulting wound to granulate. Dupuytren† had recourse to transverse division of the cicatrix at different points, with subsequent application of an extension apparatus. Skey‡ has recommended a somewhat similar procedure. James§ made an incision on three sides of the cicatrix, and dissected it upwards as a flap, allowing it to adhere to the deeper tissue at a higher level, an extension apparatus being also employed. Butcher‖ and Buck¶ have also recorded cases in which this plan was adopted. Mütter,

* Earle, 'Med.-Chir. Trans.,' vols. v and vii.
† Dupuytren, 'Leçons Orales,' tome ii.
‡ Skey, 'Lancet,' 1870.
§ James, 'Med.-Chir. Trans.,' vol. xiii.
‖ Butcher, 'Operative and Conservative Surgery.'
¶ Buck, 'American Journ. of the Med. Sciences,' 1872.

of Philadelphia,* Carden,† Teale,‡ and Holmes,§ have published cases in which, with more or less success, the cicatrix was divided, and the gap filled up with skin from the adjacent parts. Others, again, have been successful with simple extension of the contracted parts without application of the knife. Of treatment by means of transplantation of skin from a distance, in the true Tagliacotian fashion, I have succeeded in finding one case only—that of Mr. John Wood.||

No doubt any or all of these modes may be successfully employed in suitable cases, and in their selection much will depend on the turn of mind of the surgeon. The question, as it presented itself to me in the cases I am about to narrate, was as follows:—It is impossible, without more or less extensive division of the cicatricial tissue, to restore the parts to anything approaching their normal condition; this having been done, and the limb extended, what will be the best mode of proceeding with the resulting gap? I judged that the sooner it was closed the better, the extensibility of the limb being at the same time secured, and that to attain both of these ends it would certainly be better to restore the loss of tissue with sound skin than to trust to the slow process of granulation. The next question was, whence should this piece of skin be procured? Bearing in mind that there had already been considerable destruction of tissue in the affected parts, it was reasonable to suppose that, if it were possible to do so, a more satisfactory result would be obtained by transplanting from a distance than from the immediate neighbourhood. In the case of the arm there appeared to be no great difficulty in carrying this out, since the limb, when in repose, is in juxtaposition to the trunk, and it would, therefore, only be necessary to bandage it carefully in a convenient position after the application of the flap. In the case of the neck being the part affected, however, there appeared to be greater difficulty, as the long-continued restraint

* Mütter, 'American Journ. of the Med. Sciences,' 1842.
† Carden, 'Prov. Trans.,' vol. xii.
‡ Teale, 'Med. Times and Gaz.,' 1857.
§ Holmes, 'Lancet,' 1863.
|| Wood, 'Med.-Chir. Trans.,' vol. xlvi.

of the arm, in an unnatural position, would be extremely irksome, although, at the same time, as rhinoplastic operations show, the difficulty is not insuperable. I determined, therefore, in Case I, which was the first of the series which came under my care, to transplant from the trunk in operating on the arm, and afterwards, when I came to treat the neck, to be influenced by the appearance of the wound and adjacent tissues after division of the contraction, in my selection of a place, distant or remote, from which to take the necessary flap of skin. As will be seen, I selected the latter method on each of the four occasions on which I operated on the neck. In all of the four subsequent cases, the arm being the part principally involved, I was able to take the flaps from the trunk.

I shall relate the first case somewhat in detail, as in it the deformity was greatest, and it will also serve to show, without tedious repetition, the plan of treatment pursued in each of the others. The appended autotypes of two of the cases illustrate pretty well the amount of success obtained by the operation.

Case I.—Ann C—, æt. 7 years, admitted to the Clinical Hospital, July 7th, 1870. Two years previously her clothes took fire, and she was extensively burnt about the neck and right arm. The burnt surface took four months to heal. A broad cicatrix, divided into numerous bands, extending from the shoulder to the sternum, binds the head down to the right side, and makes considerable traction on the same side of the face. Another band extends from the arm to the forearm, so that the elbow cannot be extended beyond an acute angle.

July 7th.—I transfixed the cicatrix in the arm and cut out the knife. The arm was then extended as much as possible, and the tissues touched with the knife as they were put on the streteh. Before the arm could be fairly extended it was necessary to divide the tendon of the biceps. Four minor vessels were also divided. They were ligatured with carbolated silk, the ends of which were cut short. A diamond-shaped flap was then marked out on the sides of the chest at a proper level and dissected off, except at the anterior angle, where a pedicle was left about an inch in width. The flap contained the whole thickness of skin

and subcutaneous fat down to the cellular tissue. As marked out originally, it was a little less in extent than the wound to which it was to be fitted, and it contracted considerably on separation from the chest wall. The flap and wound were then dried, and the former carefully stitched with numerous points of silver suture to the edges of the latter, the inner angle of the wound, which corresponded to the pedicle, being necessarily left uncovered. A pad of lint was then placed over the flap, and the arm bandaged in a flexed position to the chest.

23rd.—Up to this time the parts were dressed as often as needful for cleanliness, and to-day the stitches were removed; flap firmly united.

30th.—Part of pedicle divided.

August 3rd.—Arm entirely detached from side, the flap being at the same time enlarged by dissecting a little more from the chest wall, to cover a considerable extent of raw surface which remains on the inner side of the arm. The elbow is stiff and is extended with pain and difficulty.

10th.—The greater part of the addition to the flap has sloughed, the portion remaining being only a rounded nodule. Pressure applied to it by strapping.

22nd.—Splint applied posteriorly for extension.

September 21st.—Neither the sore on the chest nor that on the inner side of the arm have yet quite healed. To-day part of the cicatrix in the neck was divided, leaving a raw surface about two inches by one and a half inch. A flap was dissected up from over the deltoid and turned round to fill up this gap, the surface from which the former was taken being drawn together by sutures.

28th.—Several stitches removed from flap, which is looking well. From this date to October 20th the child passed through a smart attack of erysipelas, affecting principally the parts involved in the operation. This, it would appear, was communicated by her mother, who paid her a visit when recovering from erysipelas of the face.

October 27th.—Ulcers healed; appetite good, but child pale; movement of arm fair; deformity of face less, but angle of mouth

still pulled down. Sent home, with instructions to exercise arm systematically and to return for further operation.

1871, January 28th.—Brought back to hospital. The parts have contracted considerably, the elbow being flexed nearly to a right angle and the face much drawn down. To-day a second operation was performed on the neck. An incision was made through the cicatrix from behind forwards, the head drawn aside, and the tense subcutaneous bands touched with the knife. The resulting wound measured five inches by three inches. A piece of integument not quite so large was then raised from below the clavicle, having a stalk attached to it at the sternal end; this was turned round and stitched to the edges of the wound, the edges of the subclavicular wound being also approximated. Dressed as before.

February 3rd.—A few stitches have given way, but the parts, nevertheless, look well.

8th.—Sutures removed; flap united by adhesion almost throughout its extent.

18th.—All the parts healed. To-day two incisions were made transversely in front of the elbow, the arm straightened and bandaged to a splint.

March 11th.—To further improve the condition of the neck the posterior part of the cicatrix was again divided and a flap inserted from the supra-scapular region.

18th.—Stitches removed. Union complete.

25th.—Head to be drawn to left side by means of tapes attached to a gutta-percha coronet. Splint removed from the arm.

April 8th.—Arm perfectly straight; head can be moved fairly well from side to side; rotatory power slight. Dismissed.

1873, October 14th. — Condition very satisfactory. All the transplanted flaps are soft and movable, and in colour scarcely distinguishable; that in front of the elbow is surrounded by a narrow, cord-like elevation, and the power of extension is not quite perfect. The movements of the head are quite free, but when it is directed to the left side the skin is thrown prominently outwards. To make the case as perfect as possible I thought it

would be well to remedy this defect, and to-day I accordingly divided this fold at its lower third and twisted round a flap from the front of the chest, measuring two inches by one. It was dressed as usual, and the arm comfortably bandaged to the chest.

October 23rd.—Sutures removed; union complete; wound on chest wall dressed with boracic lint.

December 15th.—The wound on chest wall has been healed for some time; the condition of the neck and arm is most satisfactory.

Case II.—Mary Ann R—, æt. 6, admitted August 18th, 1872. Was burnt six months ago by her clothes taking fire. Affected parts: left side of trunk and lower border of ribs, left arm, ear, and side of face and neck. Cicatricial contractions numerous, though the parts principally requiring operation are those at the elbow and posterior fold of the axilla. In the former situation the cicatrix is still of a dull red colour, and consists of a thickening and contraction of the whole skin and subcutaneous tissue in front of the joint. The arm is nearly fixed at a right angle, flexion as well as extension being almost impossible.

August 21st.—Tissues in front of elbow freely divided, including tendon of biceps; one vein ligatured. Complete extension of limb thus effected. A piece of skin two inches square taken from chest, with a broad pedicle attached. Carefully stitched to edges of wound. An oakum pad bandaged on.

September 1st.—Stitches removed; union complete.

11th.—Pedicle divided; a part of the wound on inner aspect of arm remains uncovered; to be allowed to granulate, the arm being kept extended by a splint.

The date of her discharge from hospital was not noted. Fourteen months after the operation the condition of the arm was most satisfactory. Motion was perfect, and the inserted flap and surrounding tissue soft and pliant, except where granulation took place, where the skin was elevated and puckered. The posterior fold of the axilla has not been operated on.

Case III.—William S—, æt. 10, admitted August 22nd, 1872;

burnt when three years old, through his clothes taking fire. Strong, bridle-like contractions extend over the front of neck from sternum to chin, making traction on lower lip; right ear much disfigured; right elbow is flexed at an acute angle by a broad, web-like band, stretching from the upper part of arm to second joint of thumb; the thumb is drawn backwards and outwards, but all its joints are perfectly movable. (See photograph.)

August 31st.—Free section of cicatrix in front of elbow, extending through the biceps tendon and part of the brachialis anticus, the deeper parts being touched with the knife, as extension of the limb put them on the stretch. The degree of flexion remaining was very slight, and such as it was thought possible to overcome by subsequent extension. Three veins were ligatured. The edges of the wound were brought together longitudinally above and below, and the middle part was fitted with a flap two inches by one taken from the chest. Stitched and dressed as usual.

September 6th.—Stitches in lower part of wound have given way; upper part looking well; flap healthy and adhering.

14th.—Pedicle divided; union favorable; posterior splint applied, while granulation is going on at lower and inner angles of wound.

November 12th.—Dismissed for a few weeks. To return for future operation.

December 21st.—Readmitted. Very slight recontraction of elbow; thumb remains in its original faulty position; transverse section of contraction at wrist, including tendon of extensor primi internodii pollicis. A flap inserted from epigastrium.

1873, January 7th.—Pedicle divided.

February 1st.—Discharged. Though thumb freely movable, its first phalanx remains almost at a right angle to the metacarpal bone, probably owing to an alteration of the joint surfaces.

August 15th.—Came to hospital to-day; arm not satisfactory, there being considerable contraction of the tissues all round the inserted flap. I advised another operation, which was agreed to. The flap was, therefore, cut across, the incision being carried on

each side of it through the cicatricial tissue; the arm then became quite straight, and a flap, about two inches by three, was dissected off the chest and fixed to the wound as before; it adhered completely, and the stitches were removed in ten days. Previous experience having shown that recontraction is most apt to occur at the inner side of the arm, where the wound, being uncovered by transplanted tissue, has to heal by granulation, I determined to repeat the operation I had unsuccessfully tried in my first case, viz. to separate the flap from the chest by dissecting off a further piece of skin, which should be attached to the inner angle of the wound on the arm. I therefore allowed four weeks to pass before separating it, in order to secure an abundant vascular supply from the arm to the flap. At the expiry of this time I added to the size of the flap in the manner I have mentioned, and was particularly careful to shave off all granulations from the under surface of the flap and from the uncovered part of the wound on the arm. The flap, being thus separated from the side, was then stitched on to the raw surface, as in previous operations. The new piece thus made available for fitting to the arm was triangular in shape, measuring about one inch by one and a half, and it was sufficient to cover the remaining wound on the arm. It adhered at once, and the stitches were removed in a few days afterwards.

During the autumn a succession of minor operations were performed to improve the appearance of the face and neck. These need not be detailed here.

December 16th.—The condition of the arm (except as regards the thumb) is most satisfactory. The power of extension is perfect. The flap is soft and movable, and the surrounding tissue free from contraction. (See photograph.)

Case IV.—John H—, æt. 4½ years. Admitted September 3rd, 1872. Was burnt on the left arm two months previously. There is a strong and thick cicatrix extending from the middle of the upper arm to the wrist. It is of a dusky red colour, and sheds scales of cuticle. The elbow is almost fixed at a right angle, flexion and extension being both very limited.

September 7th.—Division of cicatrix and adaptation of a flap of skin from the chest, as in previous cases. Two veins ligatured.

30th.—Pedicle divided. Union of flap complete. A considerable portion of the wound on the inner side of the arm remains uncovered.

November 12th.—Made an out-patient. Ulcer still unhealed.

December 20th.—Arm becoming flexed. Readmitted. Posterior splint applied. Healing afterwards progressed very slowly, but was expedited by skin grafting.

May 24th, 1873.—Parts have been healed for some time; some cicatricial scars have formed on the inner side of the arm; arm nearly straight; movements perfect.

Case V.—Alice T—, æt. 9 years. Admitted June 3rd, 1873. Fell on the fire three years previously, burning both arms. The right, the worse of the two, is shown in the photograph. The rotatory motion of the forearm is very imperfect.

June 5th.—Cicatrix of right arm divided and limb extended. During the process the brachial artery was wounded, and ligatures were applied to both orifices, the ends being cut short. A flap about two inches square was then dissected from the chest, and stitched to the edges of the wound in the usual manner. It filled the gap better than in most of my previous cases, and I succeeded in covering all but the inner apex of the wound. It united well, and the stitches were removed on the 13th. I did not consider it necessary to extend the flap, as in the case of Wm. S—, but after the expiry of three weeks cut directly through the pedicle. A small ulcer thus remained on the inside of his arm. A splint was applied, and the arm was kept straight and at rest.

The left arm was treated subsequently by division of the cicatrix and transplantation of a flap from the adjacent parts, the pedicle being twisted round.

September 27th.—All the wounds have been healed for some weeks. The right arm has also been at liberty for some time. It is all but quite straight, and flexion and extension are performed perfectly. The power of supination, however, is lost, there being

apparently some adhesions about the head of the radius. There is a well-marked scar to the inside of the flap, but all the other parts are soft and pliant. Dismissed. (See photograph.)

The following remarks occur to me from my experience in the above cases:

1. *Division of cicatricial tissue.*—I consider it most important that every band or fibre of this tissue be cut fairly across, however extensive or deep the incision thus required may be. The peculiar action which burns have on the tissues, and the peculiar nature of the scars they occasion, have not yet been well explained. It is well known, however, that the contraction so occasioned is most obstinate. If, therefore, the cicatrix be not first of all divided in its entire extent, and means also be not adopted to keep it from reuniting, an immense amount of trouble will afterwards be occasioned, and after all there will probably be recontraction at the sides of or underneath the transplanted flap. In making the section the tense fibres are easily recognised, either by sight or pressure with the point of the finger, while an assistant keeps the part extended.

2. *Extension of the affected parts.*—It happens sometimes that after the cicatricial tissue has been freely divided the contracted part, such as the elbow, cannot yet be fully extended. This is the more likely to be the case the longer the time which has elapsed since the injury was inflicted, and it is due to an interstitial shortening of the muscles and other soft parts. The more completely the parts are straightened at the time of operating the less will be the subsequent trouble, and the better, probably, will be the result. It is, therefore, important to place the part in a fairly straight position, even should it be necessary to divide muscles and tendons to effect this. Cases I, II, and III show that this may be done in the arm without any injurious effects, and the cases of Mütter show that the sterno-mastoid may equally well be divided. It is to be borne in mind, however, that this division of shortened tissues is by no means essential in the sense that it is to divide the tissue of the cicatrix. To obtain a good result it may be said that the latter is essential, while the former is only auxiliary,

much being possible by gradual extension during the subsequent treatment.

3. *Size and position of flap.*—It is natural to wish to use as small a flap as possible. Here again, however, the more thoroughly the operation is done the less will be the future trouble and the better the result. In Cases I and III I am convinced that some of the flaps were too small. I consider it much more important, however, that the flap should be large in the transverse than in the longitudinal direction. The cicatrix being duly divided and the part extended, it can easily be understood that a piece of skin which has been inserted fairly across the wound, from its outer to its inner angle, even though it be a very narrow strip, will be an obstacle to the reunion of the divided cicatrix; and further, as was ingeniously pointed out by Mr. Carden, that, being united to and acted on by a cicatrix on each side of it, it will have a capability for expansion. If it do not fill up the wound completely, however, in the transverse direction, the divided cicatrix may again unite at the defective part and occasion more or less recontraction. Consequently, I would advise that, when it appears desirable to limit the size of the flap, this limitation should be done at the expense of the length rather than the breadth. All of my cases illustrate the importance of this. It being almost impossible to adapt a flap from the front of the thorax across the front and inner side of the arm, the inner angle of the wound on the arm was always left uncovered, and had to heal by granulation, the result being a considerable scar at the spot and a corresponding degree of contraction. In such a case I think the modification I adopted successfully in the last operation on Case III an important one. In Case I its non-success is to be attributed to the granulations not being properly removed.

Mr. Wood, in the case he has recorded, lays some stress on the importance of attention to the arterial distribution of the part in cutting out the flap. The pedicle, in my cases, however, was always on the sternal side of the latter, so that as regards the chest wall, at all events, the point would not appear to be an important one.

4. As regards *division of the pedicle*, it will be seen that I left

it untouched for three weeks, and that I then divided it partially or altogether. In no case did any sloughing ensue. In no case either was any irksomeness from restraint complained of.

5. *Adhesion of the flap.*—Mr. Holmes remarks* that "it is hopeless to expect primary union where the edge of the cleft has more or less the character of a cicatrix." This opinion I cannot altogether assent to, for, although I cannot affirm that in any case complete union of the flap took place by primary adhesion, still this certainly did occur as regards the greater part of its extent in every case, pus being formed only at a few points, mostly in the track of the sutures. In every case I was satisfied that union of the under surface of the flap to the underlying tissue was accomplished in the former manner. I believe it is important, for this end, to take all tension off the parts by flexing the limb. But even if adhesion take place to a great extent by granulation, it does not on that account appear that the risk of recontraction is much greater, provided always that the original cicatrix has been fairly divided and the cut ends separated, and also that extension is kept up sufficiently long. It is more probable that relapses will occur from the parts insensibly returning to a position approximating that they have been so long habituated to than from the formation of new inodular tissue.

6. *Ligature of vessels.*—It will be observed that I used carbolated ligatures and cut them short. No further mention is made of them, for the very sufficient reason that no more was seen of them. I have found that silk, which, it is to be remembered, is an animal tissue, is, in this respect, quite as serviceable as catgut.

I trust that these cases may serve to show that freer attempts may be made to relieve a very deplorable class of affections. I have sometimes thought that, failing the practicability of obtaining sound skin from the patient himself, it might be possible to do so, in a similar manner, from a second person.

* 'Surg. Treat. of Children's Diseases,' p. 278.

STATISTICS OF MAJOR OPERATIONS

PERFORMED AT THE

MANCHESTER ROYAL INFIRMARY,

FROM JUNE 1872 TO JUNE 1873.

COLLECTED BY T. JONES, ESQ., M.B.,
PATHOLOGICAL REGISTRAR.

Lithotomy.

Sex.	Age.	Recovered.	Died.	Remarks.
M.	...	1	...	
M.	10	1	...	Urine passed naturally on the second day.
M.	...	...	Three days afterwards	Acute bronchitis supervened.
M.	58	1	...	Rectum injured; quickly healed.
M.	33	1	...	Two calculi removed.
M.	15	1	...	
M.	39	1	...	
M.	9	1	...	Ninth day, micturated in the natural way.
M.	17	1	...	Edge of incision torn by calculus, which was of a peculiar shape.

Total results—9 operations; 8 recoveries, 1 death (acute bronchitis).

Ligature of arteries.

Sex.	Age.	Vessel tied.	Cause of operation.	Result.	Remarks.
M.	36	Femoral	Popliteal aneurism	Cured	Catgut ligature used.
M.	30	Femoral	.....	...	.....
M.	47	...	.....	...	.....

Total results—3 arteries tied, 3 successful.

Ovariotomy.

Age.	Kind of tumour.	Operation.	Discharge.
28	Multilocular	May 23	June 21, cured.
54	Unilocular	May 23	June 21, cured.
	Clamp used to secure pedicle in the above cases.		
35	Multilocular	April 11	May 22, cured.
37	Multilocular	August 1	September 11, cured.
	The pedicle tied with strong catgut and returned within the abdominal cavity.		

Hernia.

Age.	Sex.	Kind.	Period of strangulation.	Operation.	Result.
53	F.	Femoral	5 days	Herniotomy	Death.
59	M.	Do.	4 days	Do.	Cured.
50	F.	Do.	56 hours	Do.	Death (peritonitis).
24	M.	Inguinal	...	Do.	Death.
30	F.	Femoral	...	Do.	Cured.
47	M.	Inguinal	52 hours	Do.	Death (gangrene of bowel).
15	M.	Dble. cong., inguinal	...	Operation for radical cure	Relieved.
45	F.	Femoral	10 hours	Herniotomy	Cured.
72	M.	Inguinal	2 days	Herniotomy, sac opened	Death.
59	F.	Femoral	48 hours	Do.	Do.
39	M.	Inguinal	20 hours	Do.	Do.
70	F.	Femoral	10 hours	Do.	Death, 47 days (bronchitis).
28	M.	Inguinal	3½ days	Do.	Cured.
66	F.	Femoral	10 hours	Do.	Death (rup. bowel).
48	F.	Femoral, incarcerated	...	Stricture divided.	Cured.

Total results—Number operated upon 15; recoveries 5, deaths 9, relieved 1.

Excisions.

Sex.	Age.	Joint resected.	Result.	Remarks.
M.	58	Wrist	Useful hand	
F.	18	Knee	Death, exhaustion	
M.	9	Elbow	Good	
M.	29	Knee	Subsequent amputation of thigh	No attempt at union.
F.	18	Wrist	Relieved	Several pieces of bone removed afterwards.
M.	12	Knee	Firm union	Six months afterwards.
F.	19	Elbow (partial)	Useful arm	
M.	9	Wrist	Useful hand	Treated antiseptically.
F.	20	Shoulder	Partial relief	More dead bone.
M.	7	Shoulder	Good	

Total results—10 excisions; knee 3, shoulder 2, elbow 1, elbow (partial) 1, wrist 3. 1 Death from exhaustion. 1 Subsequent amputation.

Amputations of breast.

Age.	Kind of tumour.	Operation.	Result.
29	Recurrent scirrhus	June 14	Healed.
46	Sero-cystic disease	July 26	Dressed antiseptically; return of disease.
53	Recurrent scirrhus	Aug. 2	Made out-patient August 26.
59	Scirrhus	Sep. 12	Healed September 30; subsequent return; death.
54	Recurrent scirrhus	Oct. 16	Made out-patient October 31.
—	Do.	Nov. 1	Made out-patient November 28.
34	Scirrhus	Nov. 8	Healed November 21.
45	Do.	Nov. 9	Healed December 12.
35	Do.	Nov. 15	Made out-patient December 9.
55	Do.	Dec. 20	Healed January 9.
48	Do.	Jan. 3	Healed January 30.
24	Fibroid tumour	Jan. 3	Healed January 14.
45	Scirrhus	Feb. 2	Healed February 22.
47	Do.	Feb. 8	Healed February 24.
46	Do.	Feb. 22	Nearly healed March 20.
47	Fibro-cystic	Feb. 28	Nearly healed April 17.
52	Scirrhus	Mar. 7	Healed April 17.
44	Fibro-cystic	March 7	Healed March 29.
...	Scirrhus	March 28	Nearly healed April 24.
33	Do.	May 10	Healed June 14
45	Do.	May 24	Nearly healed June 17.

AMPUTATIONS.	Total.	Primary for Accident.		Secondary for Accident.		Secondary for Disease.		PRIMARY FOR ACCIDENT.																SECONDARY FOR ACCIDENT.												SECONDARY FOR DISEASE.											
								Recoveries.										Deaths.												Recoveries.										Deaths.											
								Sex.		Ages.								Sex.		Ages.										Sex.		Ages.								Sex.		Ages.									
										Under										Under												Under										Under									
		Recoveries.	Deaths.	Recoveries.	Deaths.	Recoveries.	Deaths.	Male.	Female.	10	20	30	40	50	60 & above.	Male.	Female.	10	20	30	40	50	60 & above.	Male.	Female.	10	20	30	40	50	60 & above.	Male.	Female.	10	20	30	40	50	60 & above.	Male.	Female.	10	20	30	40	50	60 & above.	Male.	Female.	10	20	30	40	50	60 & above.
Forearm	11	5	...	1	...	4	1	5	...	...	1	...	3	1	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	2	...	...	1	1	2	1	...	...	...	...	1	...
Arm	18	9	3	3	1	2	...	9	...	2	2	2	2	1	3	...	1	1	...	1	...	3	...	...	1	1	1	...	1	...	...	1	...	...	...	...	...	1	1	...	...	2	...	...	...	...	...	...	...	...	...
Shoulder-joint	4	...	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...
Foot	10	1	...	...	...	9	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	4	...	9	...	...	...	...	...	...	...	...	...
Leg	13	2	2	2	1	5	1	2	...	...	...	...	2	...	...	2	...	...	...	2	...	...	...	1	1	...	...	...	1	1	1	...	...	...	...	...	...	1	3	2	1	2	...	1	...	1	1	...	1	...	...
Thigh	18	3	3	3	...	7	2	3	...	...	3	...	...	...	...	3	...	...	...	2	...	...	1	2	1	...	1	1	...	...	1	...	...	...	...	...	...	...	6	1	...	1	4	1	...	1	1	1	...	...	1	...
Hip-joint	4	...	1	...	...	2	1	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	1	...	...	2	...	...	...	...	1	...	...	...	...
	78	30	9	11	3	29	6																																														

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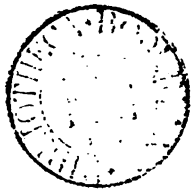

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LIVERPOOL AND MANCHESTER

MEDICAL AND SURGICAL REPORTS.

SUGGESTIONS AS TO THE MEDICINAL TREATMENT OF THE UNBORN CHILD.

By J. THORBURN, M.D.,
LECTURER ON MIDWIFERY AND DISEASES OF WOMEN TO OWEN'S COLLEGE SCHOOL OF MEDICINE; OBSTETRIC PHYSICIAN, ROYAL INFIRMARY, MANCHESTER.

(*The substance of a Paper read before the Manchester Medical Society, Oct. 7th*, 1874.)

THIS paper, as its title implies, aims at little else than mere suggestion. I must, therefore, apologise for the audacity which has permitted me, at the present day, to bring forward a communication containing very few new facts, and especially no new nomenclature, and which indulges in a certain amount of *à priori* hypothesis, though I trust that the latter will be forgiven, seeing that it is held in honest subjection to actual and future facts.

The pre-natal treatment of the child has always appeared to me to be strangely neglected as a subject of practice or investigation, and I trust that the few observations I have to make upon it may be the means of directing the attention of others, more qualified than myself, to lines of thought and experiment which ought to be productive of valuable results.

It would strike one that at a time when the fœtus is so plastic that its most salient features have yet to be evolved, while its

very sex is still a matter of possible doubt, and while its recuperative powers are still so great that, as in lower organisms, the reproduction of a limb or other organ is occasionally attempted,—it would strike one that, at this early period, much might be done to give a healthy direction to future vital processes, or to correct what was, from the observation of former offspring of the same parents, presumably amiss. Yet how little is said or even surmised upon the subject in ordinary available works on obstetrics or diseases of women and children, beyond the usual popular "advice to mothers."

Knowing that in early childhood the foundations of future health or disease are so often laid, why should we abandon the attempt to act upon a still earlier period, before any external influences have been at work to thwart our efforts?

I strongly suspect that the crude and ridiculous dogmatisms of early writers, ere anything like scientific precision was introduced into medicine, upon the subject of generation, and upon the influences which determine the condition of the fœtus, have had much to do in deterring recent investigators from the study of this subject. Fortunately, these dogmatic assertions are now being rapidly banished from medical literature, though it is doubtful whether much is gained by transferring them, under the auspices of some of our popular magazines, to the consideration of the young ladies and gentlemen of the present generation.

The effort of the late Sir James Simpson to prolong the life of the fœtus when it was threatened by diminished placental vitality was a bold stroke in the direction indicated. I know, of course, that differences of opinion exist as to whether the administration of chlorate of potash to the pregnant female does actually increase the oxygenation of the blood, and whether the life of the fœtus is thus really prolonged, in spite of a diminished healthy placental surface.

For my own part I have made several trials, and have come to the best conclusion I can, viz., that although sometimes the practice is apparently resultless, yet sometimes it is as apparently successful. Whether the true explanation of this seeming success may not occasionally lie in the counteraction of maternal syphilis

I am not prepared to say, but the suggestion, be the theory of action right or wrong, was a bold one, and should ere this have led to some results in collateral directions.*

I need hardly dwell on the fact that certain morbid poisons, such as the *contagium* of smallpox, scarlatina, &c., may be conveyed to the intra-uterine child, but I will just mention one illustrative case that would seem to point to the fact that the child may thus contract infectious disease which the mother herself is capable of resisting.

Mrs. G. K—, being pregnant, was exposed to the influence of scarlatina. About a fortnight subsequently she was confined of a female child, a little before the expected time. The child when born was covered with desquamative scales—no very rare occurrence; but in a day or two suppuration of the cervical glands set in, and the urine was for three or four days highly albuminous. A *fortnight afterwards* the mother was attacked by scarlatina which ran a tolerably severe course. Both mother and child did well. I can hardly resist the conclusion that in this case the fœtus received the poison and suffered its primary effects while yet unborn, the mother being then insusceptible, and that she afterwards, probably owing to her puerperal weakness, became susceptible and was infected by her own offspring.

Without such a case as this, however, there are quite sufficient on record to prove that the intra-uterine child may suffer from various forms of eruptive fevers. I should, however, in fairness mention the fact that in 1870 I vaccinated several pregnant women successfully, and that I found no insusceptibility in their infants. If necessary I think that a satisfactory explanation of this could be found in the more or less localised nature of vaccinia.

Taking it, then, for granted that what I may, for the nonce, term the natural poisons may be communicated to the fœtus, it is no less true that many, if not all of our potent drugs—let us call them artificial poisons—may have also a decided physiological effect. No better instance of this could be met with than the action of strychnia. For some years I have been in the habit of

* Simpson's original investigations on the matter may be consulted at p. 142, *et seq.*, of the recent edition of his obstetrical works by Dr. Black.

administering small doses of this drug during the last months of pregnancy where I had reason to suspect, from former deliveries, the occurrence of uterine inertia and consequent flooding. The immediate result is to produce much more than usually violent spasmodic movements of the fœtus. The patient remarks the phenomenon without being aware of the cause. In the administration of chloral hydrate for the sleeplessness of pregnancy I have likewise been often told that "at any rate it keeps the baby still."

Assuming, then, for the sake of brevity, that whatever agent is capable of being introdueed into the blood of the mother and of being passed through the placental villi is also capable of affecting physiologically the fœtus, I will also assume the next step—that whatever affects the unborn child physiologically might also affect it therapeutically, and that disease might thus in its earliest stage be prevented or cured, if only we could have the means of diagnosis that disease or the tendency to disease was present.

Should any one doubt this necessary connection between physiological and therapeutic action I must reserve it for future discussion.

I have limited, however, our aspirations in the therapeutic direction by the very useful conjunction "if." *If* we can diagnose disease, or the tendency to disease in the fœtus, certain therapeutic agents may be brought to bear upon it. But this diagnosis must always be attended by extraordinary difficulties, and can hardly ever be quite free from doubt. Yet are we not often compelled to act under almost equal difficulties in the case of the adult? and yet with the happiest results. Nor do we hesitate to act, indeed we must do so, in many of the most ordinary and some of the most important affairs of life, upon a balance of probabilities. Pure absolute fact is, of course, the only foundation upon which medicine can be based as regards its future progress as a science, but as practitioners of the greatest of all arts we are daily called upon to act in the living present, and to walk by the light we have. Though we stand at the bedside of a Huxley or a Darwin, they will little thank us if we defer all action until medicine become an exact science.

General conditions of system, dyscrasiæ, diatheses, tendencies to disease—these can only be surmised with regard to the fœtus, but many of them can be surmised with at least an approach to certainty. Two consumptive parents may not produce a child which will become consumptive, or which will transmit disease of the kind to its offspring, but we are fairly justified in acting on the supposition that they will*—syphilis is seldom so dormant that it is not traceable in the second generation, and any morbid condition which we find in two or three successive children of the same parents is, unless there be some decided change of circumstance, most probably the fate of their successors. Another line of thought, which is being rapidly worked out, which has emerged from the region of chaos, though it has by no means arrived at the goal of order, will be of infinite value in this diagnosis of the unseen—I allude to the almost certain relationships which exist between various and often unlike forms of disease. The now perfectly ascertained link of connection between rheumatism, cardiac disease, and chorea, is a familiar illustration of the kind of natural classification to which I allude; the psoriasis group, or from a therapeutical point of view the arsenical group, is another not yet so clearly established. However unphilosophic it may sound I cannot help expressing my confident belief that the day will arrive when some medical Dalton will be able to show that our various diseases are but the atomic conjunctions of certain elements or elementary lesions which, as knowledge advances, will be found to be fewer and fewer and combined in more evident family groups. Be that as it may, we have already sufficient evidence of such grouping as to be of some use for diagnostic and therapeutic purposes.

I have thus indicated as briefly as possible certain things which I think may, can, or will be done in the pre-natal treatment of disease. When I come to speak of what has been done I fear you will at once see the necessity for my apologetic introduction. Let me, however, endeavour to show what enormous difficulties, none of them insuperable, stand in the way of exact experiment or

* Recent investigations on atavism, on the sexual limitation of hereditary diseases, &c., such as those of Sedgwick, may prove of confirmatory value.

research. To say nothing of the difficulties that surround therapeutic inquiries even in the adult, we have here added those to which I have just alluded, arising from the increased obstacles to accurate diagnosis. When the mountain was in labour the most skilled obstetrician could hardly have prognosed the kind of offspring which would result. Looking at the matter as a mere scientific experiment, this alone would be fatal for the present, but if we are to await the arrival of absolute certainties we must abandon the *Ars medendi* for centuries to come, possibly for ever. The *corpora vilia* of the present generation must be submitted to the experiments of those who attempt therapeutics in spite of the darkness that surrounds them.

Supposing, however, that a fairly accurate diagnosis of the fœtal morbid conditions is often possible, we must remember that it depends to a great extent upon our knowledge of the parents and of their previous offspring; and hence arises another great difficulty, for who can collect the *data* for a sufficient number of accurate observations? The pure specialist is out of court at once. The clinical ward, that great field of medical investigation, is almost useless, for what reliance could be placed on the family history given by our average hospital patient, even if long enough under observation during pregnancy? The family practitioner can alone supply the necessary *data*, and he, only if he will take the trouble to collect his experiences for many years in succession. I have said enough, I think, to explain the meagreness of the actual facts producible.

Admitting at once that the exigencies of my daily work afford me but little time for medical literature of a retrospective nature, I can find scarcely any traces of work of the kind. Among them I claim Sir J. Simpson's experiments with chlorate of potash, of which the least that can be said is that a mind so acute as his was satisfied that he could thus oxygenate the fœtal blood by means of drugs, and by doing so could in certain cases save its life.

I dare-say that few are familiar with the experiments of M. Delfrayssé, referred to in the 'Medical Times' of 1850 (vol. xxi, p. 418). Recognising the undoubted fact that children are frequently lost during successive hard labours owing to only a

moderate disproportion between the head and the maternal pelvis, he administered iodide of potassium during pregnancy with a view to stunting the growth and lessening the size of the fœtus at term. As far as his few cases go they tend to prove the possibility of this action of the drug. I have not seen any confirmation of these experiments elsewhere, and have refrained from any myself from a belief that, however interesting they might be physiologically, they are indefensible obstetrically. Perhaps in the obstetric laboratory of the future, spoken of by Dr. Matthews Duncan, something may be done. I have certainly administered iodide of potassium to the pregnant female suffering from syphilis, but under such circumstances any diminution in the size of the offspring could not safely be attributed to the iodide.

Previous to Delfrayssé's experiments, M. Depaul* had endeavoured by means of repeated bleeding and low diet to bring about the same result. For the same reasons I believe this practice also to be obstetrically inadmissible, and according to the recent observations of Sir James Paget,† bleeding is to be regarded almost in the light of a mere innocent amusement, having little or no effect beyond the next twenty-four hours.

To syphilis one naturally turns as a fruitful field of inquiry as to the pre-natal treatment. Here we have an endless literature, an almost certain diagnosis of the fœtal dyscrasia, and to say the least, strong opinions on the action of remedies in the adult.

Not to enter into debateable questions, I will simply assert my belief that mercury does in many instances modify and remove the external evidences of syphilis, and that it may, contrary to the opinion of some, be safely given to the pregnant female, so long as it is not allowed to produce severe physiological symptoms. Our inquiry, however, regards the fœtus only, and in corroboration of the opinion which I hold that we can beneficially treat the unborn child independently, in a sense, of the mother, I must quote two remarkable cases, having met with several others which in a less degree confirm their evidence. Mrs. ——, was married in 1858, her husband then suffering from

* 'L'Union Médicale,' Jan. 12, 1850.

† 'Brit. Med. Journal,' Aug. 15, 1874.

syphilitic rupia, &c. He was treated non-mercurially, and was in a few months apparently well. In the mean time she became pregnant. About the fourth month she had a suspicious eruption, for which I administered bichloride of mercury in doses of $\frac{1}{12}$ of a grain. The eruption soon disappeared, and I greatly doubted the correctness of my own diagnosis. Nevertheless she took the bichloride for about three months. At the full time a healthy son was born and he continues healthy till now. During next pregnancy, which speedily followed, there was no indication for any treatment. Mother and father continued well, and accordingly nothing was done. The child, healthy looking at first, was soon attacked with well-marked snuffling, condylomata, and scaly rash. It was treated by mercurial inunctions and did well. During the third pregnancy I prescribed "tonics," the tonics consisting of bichloride of mercury. This child was and is healthy. In the fourth pregnancy nothing was done. This child showed nothing absolutely characteristic of syphilis, but was puny and stunted, and is now the inmate of an asylum for idiots. Two children have since been born, who are reported to be fairly healthy, but they have now left Manchester. To complete the case—the mother has never had any other signs of syphilis, but the father is the subject of what I believe to be syphilitic disease of the brain.

The second case is this. In 1867 I was consulted about a miserably syphilitic child. The history was this. The father had syphilis when married and was for a long time under treatment. The mother never had any detectable symptoms, but it was a case in which we had to be very guarded in putting questions. Her first pregnancy terminated about the eighth month, the child being covered with pustules and dying in a few hours. Next she had three abortions in succession. The present child approached full term. It was a pitiable object, and died under our care in four or five weeks. I could now detect no sign of syphilis in the father. The mother obstinately declined to take any form of medicine, and between this time and 1870 she had again two abortions about the fourth or fifth month. I was then again consulted, and under various pretences we contrived during her

next pregnancy to keep her on a mild mercurial course nearly the whole time. The event was in excess of what I anticipated. She has now a fine healthy little boy of about three years old, who has had no illness since birth. She has had no pregnancy since, but I saw the family lately during an attack of typhoid fever from which she suffered. Time will not allow me to dwell further on these cases; their bearing on our present topic must be obvious.

Syphilis is a disease which, according to our present ideas, possesses a specific character, has a definite series of symptoms, and can thus be recognised, named, and treated. But there are other groups of symptoms to be met with which cannot very well be thus focussed for the purposes of nomenclature, and yet which for the purpose of treatment can hardly be separated. In illustration of what I mean, let me describe what must over and over again have occurred to all of us. Two parents, often healthy as far as can be ascertained, occasionally one or both somewhat delicate, but neither of them necessarily suffering from any special disease, have in succession four, five, six, or more children, every one of which, almost from birth, evinces great delicacy of constitution. They are invariably anæmic, they are almost equally invariably ailing from something, but you cannot possibly foretell whether that something will be gastric disorder, mesenteric disease, ordinary abscess, or anything else. Many of these children are thus cut off in one way or another, but treatment has generally a remarkable temporary effect upon them. Iron usually tells at once, and after a perpetual round of that drug, of cod-liver oil, and of sea side, they are gradually dragged up to man or womanhood. Of course those who die die of tuberculosis, struma, abscess, convulsions, and so forth; those who survive are not tabulated. Now, I feel firmly convinced that in such cases much may be done by pre-natal treatment.

The first case that brought this forcibly to my notice was that of a lady who had two fair delicate children. In her third pregnancy she was almost constantly under my care for severe uterine hæmorrhages, and was treated by saturating doses of iron. I never expected her to arrive at the full time in safety, but she did

so, and gave birth to a large healthy child of dark complexion, black-haired, and up till over three years of age as healthy as could be desired. He then died of fever. Her next child was again fair, and has suffered from morbus coxarius. We know that these divergencies occur in families, when the cause, and there must be one, is inexplicable. In this one it struck me, some time afterwards, that the iron might be the factor. From that time I endeavoured to test the matter, but those who know the paucity of cases in private practice, where one can carry on any scientific experiment of this kind, will not be surprised to learn that the results are hardly tabulable, although they have served to convince me of the truth of my view. In only four instances have I succeeded in getting patients who have had several children of the kind referred to, to take any large quantity of iron during pregnancy; but in the whole four there has been a decided improvement in the succeeding child, and always accompanied by a darker cast of complexion. Proof which can or ought thoroughly to satisfy others can only be obtained by the combined observations of several practitioners. Having seen what I have, and believing as I do, I merely put forth these statements of mine for what they are worth. I should desire, however, to recall the fact that the cases to which I now refer are not those observed in the children of phthisical women or of under-fed ones. The former, for what reason I cannot say, often produce children which for years are healthy and vigorous; and the children of the poorest working people are for the most part strong at the outset. I forbear to speculate on the cause.

Having got at the idea of pre-natal medicinal treatment, I have made many other attempts in the same direction, most of which, though highly interesting to myself, are, from their isolation, of little scientific value; and I think I shall best fulfil the purely suggestive objects of this paper if I conclude by pointing out certain fields of experiment, in some of which I have *data*, valueless alone, but which, added to others, might prove of service. Take, for instance, the whole class of neurotic diseases. I do not attempt to define or limit them, nor pretend that you can always predicate their occurrence; but we know that convulsions with no

traceable organic lesion, chorea, laryngismus, insanity, and other so-called nervous affections, are often met with in startling abundance in certain families. Now we know also that we can physiologically affect, for good or evil, the nervous system of the unborn child. What I have said about chloral and strychnia points to this; and I think—but I strictly confine myself to the word think—that I have thus prevented the occurrence of convulsions after birth, by the previous administration of bromide of potash. It would only weary you to detail cases in which I have at least attempted treatment in this direction; and I shall content myself with merely affirming the fact that twice I have seen several successive children suffer from convulsions, and occasionally die thereof, while the next one after the pre-natal administration of bromide of potash has been free from anything of the sort, and that other less striking coincidences, if any one choose to call them such, have also been observed by me. The tubercular diathesis, if I may be allowed the term, is surely amenable also to some improvement at this early stage. Nothing ever struck me so forcibly as the number of cases of phthisis in children which I met with during the existence of the cotton famine in this district, and especially their amenability to treatment by cod-liver oil. It seemed to act like a charm on the general health, and to correct at once the progress of local mischief. Along with this there was a large decrease in the number of cases of rachitis. The cause was evident: the babies, who suffer chiefly from rachitis, were fed upon maternal milk in much greater numbers than ordinarily; the older children were fed by the Relief Committees on bread, bacon, and soup, milk being seldom given, owing to the difficulty of distribution. I only allude to the fact here for the purpose of suggesting how much more may often be done in early childhood than in later years, and thus of strengthening our hopes with regard to the fœtus. I must admit, however, that it would be difficult to obtain evidence of beneficial treatment in these cases. Tubercular mothers so frequently produce extra-strong looking infants that only a very prolonged observation of family histories could avail us anything. Is it not a possibility that the treatment of the mother who is known to be phthisical may often, though

unintentionally, show its fruits in this plump and vigorous condition of the child at birth?

Among other affections which deserve empirical attempts in the meantime, in the way of pre-natal counteraction, and which, if the subject can ever be properly studied, would furnish valuable opportunities for the statistical method, I may merely mention bronchocele and cretinism, skin diseases of various kinds common in infancy, malarial or periodic diseases, rachitis and scrofula. These, together with those to which I have more fully alluded, are among the most likely for the purpose.

Finally, I do not conceal from myself the difficulty of the proceedings I suggest. I know as well as any one the obstacles in the way of all such inquiries. Our knowledge of the more minute anatomy of the body is yet in its infancy; the physiological study of its functions necessarily lags behind; embryology, as a science, is almost a sealed book; the pathology of disease cannot advance beyond these; therapeusis, in spite of a few earnest endeavours of later years, is almost empirical. Add to all these difficulties the special ones to which I have in this paper alluded, and I could not draw a more discouraging picture. But the old maxim that "the gods help those who help themselves" is as true as ever; and I am sure that a little genuine work in the direction I have indicated would avail much to lift us somewhat out of our rut of helpless therapeusis. If only some four or five gentlemen would work together for a while, who could combine a knowledge of therapeutic literature with the capacity for physiological experiment on the lower animals, and with the opportunity of conjointly observing disease as it occurs in private families, I am satisfied that some very decided additions would be made to the science we are all studying, and to the highest of all arts at which we all aim.

THE HYPODERMIC INJECTION OF ERGOTIN.

By W. J. CLEAVER, M.B.,
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The use of ergot of rye in this country seems to be almost exclusively employed in obstetric practice, but believing that its more extended use may be found beneficial in general practice, I propose making a few remarks regarding its applicability as a hæmostatic in various diseases, especially in the form which has been called *ergotin*.

There appears to be a little difficulty with some chemists as to what *ergotin* really is, some vaguely calling it the active principle of ergot, as, indeed, its name implies; others that it is the pharmacopœial liquid extract of ergot evaporated down to the consistence of an extract. But that form which has been most generally employed both in this country and on the Continent is the so-called *ergotin* prepared by Bonjean's process, and is simply a purified extract, the following being the mode of preparing it: "Exhaust the ergot with water, evaporate to the consistence of syrup, precipitate the albumen, gum, &c., by a large excess of alcohol, decant the clear liquid, and evaporate to the consistence of a soft extract;" it is thus an alcoholic extract, whereas the extractum ergotæ liquidum is only half so.

Badly and carelessly prepared ergotin is liable to do harm when administered hypodermically, and to induce erythema and cellulitis by the injection of very small quantities, so that great care should be employed as to the source whence the drug is obtained.

Ergot has long had the reputation of being a styptic, and if its physiological action of inducing contraction in the involuntary or non-striped muscular fibre was more generally known and acted upon, its sphere of usefulness would be very greatly extended.

Dr. Jacobi, Dr. Meadows, Brown-Séquard, and others, have written upon the physiological action of ergot, and Von Langenbeck and others on the Continent have used ergotin most successfully in cases of aneurism and hæmoptysis.

In 1870 Dr. G. W. Balfour, of Edinburgh, recommended the hypodermic injection of ergotin in hæmorrhages of various kinds, and being at that time a resident surgeon in the Edinburgh Infirmary, I was able to test the treatment in cases of oozing after operations and in epistaxis, but did not keep notes of the cases; it was also generally used over the hospital for hæmoptysis and hæmatemesis with surprisingly good results.

During the time I was house-surgeon of the Liverpool Infirmary, as may be supposed, I saw a considerable number of patients suffering from epistaxis, but have never had occasion to plug the posterior nares in a single instance, treatment with ergotin being invariably successful. I kept notes of most of these cases, and the following are selected from among them:

Case 1.—A butcher, æt. 28, had suffered from attacks of epistaxis, which had occurred monthly for the five months previous to his presenting himself at the infirmary; each attack had lasted for three or four hours, and he had been treated with gallic acid and iron; on two occasions his posterior nares had been plugged, but with little benefit. The day he presented himself at the Infirmary the hæmorrhage was copious, apparently coming from both nostrils, and he had then been bleeding for half an hour. I injected five grains of ergotin dissolved in twenty-five minims of water into his forearm; in less than four minutes the hæmorrhage had entirely ceased, and as the man was working at the slaughter-house just below the Infirmary I allowed him to leave. In three weeks he returned, being just in the same plight, and during the next four months he came up five times, when the same treatment was adopted with the same success. Six months after I called in to see him and he had had no return.

Case 2.—A girl, æt. 18, who a fortnight previously had been plugged for epistaxis. The hæmorrhage had returned; and her horror of the previous operation was so great that she said she

would rather suffer any pain than go through it again. Four grains of ergotin were injected, arresting the bleeding within three minutes.

CASE 3 was a sailor, looking anæmic and blanched, who, on the voyage home from Calcutta, had bled seriously at the nose about every third day. He was admitted into the Infirmary; the day after, the hæmorrhage came on—not copiously, but, in his weakened condition, to a very dangerous extent. I injected five grains of ergotin, when the bleeding almost instantly stopped. The patient stated that when at sea he could never get the blood to cease flowing under two hours, with cold applied to the back of the neck and face, and washing his mouth out with cold water. The hæmorrhage returned slightly four days after, and was instantly checked with the ergotin. A fortnight after, he was discharged, no return having taken place.

The remainder of the cases of epistaxis were all treated in the same manner and with the same results.

I have notes of only two cases of hæmoptysis treated with ergotin. The first was a tubercular-looking girl, æt. 17, who had suffered from hæmoptysis for some days previous to my seeing her, bringing up mouthfuls of bright red blood. I injected four grains of ergotin; and although I kept her under observation for four days, only two bloody sputa followed, and those within half an hour of the injection. There were no signs of tubercular mischief in the lungs.

The second case was a woman, æt. 32, who had been spitting blood for the past three months; and on the day of her admission, according to her own account, she had vomited up a pint of bright red blood, and was when I saw her still bringing up mouthfuls. Five grains of ergotin were injected; no blood was expectorated for five days, when there was a slight return, the sputa just being streaked. For the next fortnight she rapidly gained strength, and there was no return.

There is one other case I would mention, of a woman who was admitted into the Infirmary with flooding from a fibroid tumour of the uterus. The vagina had been plugged before admission with

sponges, but the hæmorrhage was still very considerable. I injected five grains of ergotin, which arrested the bleeding in two or three minutes. Exactly twelve hours after, the flooding recommenced, and was stayed in the same manner; and for the next three days I had to repeat the process every twelve hours. The blood became very watery, and the patient eventually died from loss of blood and sheer exhaustion, four days after the last injection of ergotin.

There are many other cases I might cite, such as bleeding from internal hæmorrhoids and in dysentery, which were successfully treated with ergotin; but the foregoing, I think, are sufficient to show that ergotin, injected subcutaneously, possesses in a remarkable degree the properties of a hæmostatic.

In addition to its successful use in the cases of epistaxis above mentioned, the simple manner of application, which is effected by passing a needle under the skin, compared with the disagreeable operation of plugging the posterior nares, should not be lost sight of.

More recently I have found, by treatment in various cases, that three grains of ergotin have proved quite as efficient as five; and as bulk is a great consideration in subcutaneous injection, I have adhered to the smaller dose. This amount, viz., three grains, can readily be dissolved in ten minims of warm water.

The pure ergotin, when kept covered in a porcelain pot, will keep for any length of time; but when liquefied with water, it soon loses its active properties, and becomes inert.

These brief remarks are offered, trusting that more general attention may be drawn to the use of this valuable drug, and in the hope that they may lead to further experiment, from which good may result.

SYPHILIS AND SYPHILITIC AFFECTIONS OF THE NERVOUS SYSTEM.

By J. H. BARNES,
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Sexual, contagious, and *hereditary* syphilis, has become interwoven into the very web of human existence.

Its effects are as varied as the human organism, and as widespread as the human race, and though it does not in these present times, as it did of old, go forth in its might and slay its thousands at a stroke, it slays none the less, albeit its victims are stricken in units and in secret.

A disease of many aspects, it has ever presented features of peculiar interest for medical inquiry, and few diseases have given rise to a greater variety of conflicting opinions.

Possessing no insignificant history, its voluminous literature evidences the attention it has received at all times from the ablest minds of our profession. In spite of this attention, however, it has only within a very recent period become disassociated from a mass of error and confusion truly astounding.

From the sixteenth to the present century all venereal diseases were confounded together, Benjamin, Bell, and Ricord being the first to demonstrate the separate existence of gonorrhœa.

In 1852 Bassereau advanced another stage in the disentanglement of the confused skein by separating the non-constitutional soft, from the constitutional hard chancre. The true nature of the disease was not, however, fully realised till Dittrich and others disproved the dogma of Hunter and the opinion of Sir Astley Cooper, who taught that "this disease does not appear capable of exercising its destructive influence on the vital organs." With

the evidence that *no* organ and *no* tissue of the human body is free from its effects, the true constitutional character of the disease became recognised.

Writing in 1868, Dr. Moxon says "that even yet the frequency of the syphilitic causation of disease is not so familiar and ready to the mind as it should be," and I fear his words still bear application.

As early as 1846, Ricord seems to have had a suspicion that many cases of paraplegia were due to tertiary syphilis. In 1848 his allusion to the subject, though more definite, was still very slight.

It was not till the year 1852, 1854, and 1860, when Dr. Read, of Belfast, and Dr. McDowell, of Dublin, published cases of syphilitic meningitis and other affections of the nervous system recovering under the influence of mercury, that the subject began to assume definite form.

In 1861 Jonathan Hutchinson and Hughlings Jackson wrote on the subject and narrated a large number of cases collected from different sources, while in 1862 Zambaco, a pupil of Ricord's, wrote an elaborate essay entitled "Syphilitic Affections of the Nervous System." Later still, the subject has been developed by Robin, Bazin, Wilks, Moxon, and many others at home and abroad, and at the present moment the latest expression of opinion on the question may be found in the Lettsomian lectures of Dr. Broadbent, lately published.

At the present day syphilis is generally acknowledged to be a specific contagious disease, possessing a definite period of incubation, originating a febrile state of the system, exhibiting a characteristic symmetrical eruption, giving rise to a reproduction of the virus in the blood, thus making the victims sources of disease, having the capacity of rendering its subject insusceptible of re-inoculation, and possessing a liability of being accompanied by various organic lesions. In these respects it somewhat resembles the exanthemata. Its symptoms were early seen to present certain peculiarities in the time and order of their appearance, and it has become customary to arrange them into primary, secondary, and tertiary. As some, however, deny the existence

of the later tertiary symptoms, and attribute their existence to the remedies used in the treatment of the primary and secondary ones, and as others base their classification on the *time* of the appearance of the symptoms, whilst others, again, disregard the time of their appearance, and only consider their nature, great confusion exists on the subject.

Dr. Wilks looks on syphilis as a blood disease characterised by a tendency from its commencement to deposit, varying somewhat according to the tissue in which it takes place. This deposit is early seen and recognised in the periosteum as nodes, as condylomata, and mucous tubercles in the skin and mucous membrane, as nodules in the tongue, the muscles, and the iris. It is followed by secondary results, due to its extent and the anatomical position it may occupy. He considers the secondary and tertiary lesions in the light of different stages of the same disease; he calls the whole, from beginning to end, simply syphilis. Fully recognising certain changes due to conditions of the system set up by the disease, he calls these the sequelæ of syphilis.

Dr. Broadbent, however, entirely differs from Dr. Wilks, and thinks the difference found in the symptoms better explained by accepting Mr. Hutchinson's idea of the disease resembling a fever, and looking on the tertiary symptoms of the disease as the sequelæ of such fever. He professes to class these tertiary manifestations, not according to their time of appearance, but according to their order and nature. Adopting the classification of Mr. Lane, he says the lesions are as follows:

Secondary:

Of skin.—Macular, papular, tubercular, vesicular, scaly, and pustular *eruptions.*

Mucous membrane.—Mucus tubercle, superficial and deep *ulcers.*

Muscles and fascia.—Arthritis, bone-pains, periostitis, and iritis.

Tertiary:

Skin.—Cachectic, rapid, and rupial *ulcers.*

Fibrous tissues.—Orchitis, arthritis, periostitis, caries and necrosis of bones.

Muscles and organs.—Deposits of fibro-plastic lymph, lardaceous and waxy degeneration.

The first class of lesions, he says, are benefited by mercury and not by iodine. The second class are benefited by iodine, and not only not benefited, but injuriously affected by mercury.

There is a plausible completeness about this quite charming. If it were not true, we could wish it were true.

But objections to this classification at once suggest themselves. Firstly, one symptom, periostitis, is placed in both tables. Then, while the deposit of fibro-plastic lymph is placed in the category of tertiary symptoms, iritis is classed among the secondary lesions. Again, who cannot at once see the radical difference between caries and necrosis of bone, and periostitis and orchitis, with which they are classed, and between fibro-plastic tumour and amyloid degeneration of organs also bracketed together? The table, though accepted by Dr. Broadbent, entirely contradicts his first canon of classification, namely, the arrangement of symptoms, not on the plan of their time of appearance, but their nature. If we turn from the symptoms to the pathology of the disease, we are met with the same uncertainties and differences of opinion. Some look upon the anatomical structure of syphilis in the light of true inflammatory products, and consider that they possess no specific characteristics. Virchow, on the other hand, considers the gummata as amongst the class of non-inflammatory formations called granulation tumours, and Wagner considers them as characteristic of the disease, as are the products of cancer and tubercle of their diseases. He indeed designates this by a specific title—syphiloma. Some profess to have discovered two distinct lesions, one consisting of the true gummy deposit, and the other of localised fibroid changes. Dr. Wilks, with the same unity of conception he brings to the consideration of the symptoms of syphilis, looks upon the difference in the appearance and character of syphilitic deposits as due to differences of position and time of origin of such deposit. He considers the latest and hardest

tumour of tertiary syphilis as originally of the same nature as the primary induration at the point of inoculation. Fluid or semi-fluid in consistence, albuminoid or fibroid in nature, poured out amongst various tissues; it gives rise by hardening to a more or less definite tumour, involving in itself the tissue affected, and taking the shape of the position in which it may be poured out. These tumours may remain inert for years, or they may undergo a process of secondary softening. Upon microscopic examination they are seen to consist of fibro-plastic material, small nucleoli, fatty granules, and amorphous matter, and often the tissue in which they are deposited may be seen permeating them.

Being a deposit, and not a tumour growing from a point, it is less homogeneous and less easily enucleated than other tumours. This view of the nature and origin of syphiloma receives support from the fact of their position, which is chiefly in parts well supplied with vessels, as the optic thalamus, corpora striata, and about the third and fourth nerves, and also from the rapidity of their appearance and disappearance. Virchow says gummatous tumours of the brain never soften in the centre like tubercle, which generally degenerates early.

The same diversity that surrounds the question of symptoms and pathology of the disease surround its principles of treatment. We have the mercurialists and the anti-mercurialists, the iodists and the iodo-mercurialists, each advocating his special remedy.

The two following cases, which present a contrast and a parallel, will serve somewhat to illustrate the subject. The first is that of a medical man attached to a large institution, the second that of a patient under his care.

During the latter part of June, 1866, whilst passing through the wards of the lying-in hospital to which he was attached as surgeon, at the request of the nurse he hastily examined a patient, being quite unconscious that *she* was the subject of syphilis, and that *he* had a scratch upon the knuckle of the index finger of the right hand.

In about three weeks' time a hard brawny swelling of a deep purple colour, and about the size of a horse-bean, made its appearance on the finger. On the top of this induration was a

superficial ulcer discharging a thin watery fluid, the obstinacy of which in refusing to heal under ordinary treatment was attributed to its position over the joint. The absorbents of the arm now became inflamed, and a hard lump nearly the size of an egg formed in the right axilla. This never suppurated. Next followed slight sore throat, profuse macular eruption, and at the same time a node on the right clavicle and another on the right ramus of the lower jaw.

Under a very mild mercurial-iodide treatment these symptoms gradually subsided and were thought no more of.

In the early part of September of the same year, whilst walking home one evening, he was suddenly seized with an acute pain over the sternum and right side, so severe as to make movement and breathing extremely difficult.

In the months of October and November ntense pains in the head were experienced, so violent as to preclude sleep except under the influence of large doses of Liq. Opii Sed. or Tr. Cannabis Indicus, as much as a drachm of one or the other being taken at a time. The sense of hearing about this time also began to be greatly disturbed. There was heard a constant heavy buzzing sound and a shrill singing whistle, and at times a noise as of carpenters hammering down a new floor.

In the following March (1867) he happened to break his right clavicle, and whilst suffering from this accident an eruption made its appearance abont the face and head, for which he underwent a short course of mercurial inunction.

For the next eighteen months he was subjected to a variety of disturbances, consisting for the most part of general indisposition, acute nerve pains, and sensations of pain and pressure over the sternum. These were followed by double sarcocele, one testis becoming nodulated and the other large and ovoid.

All this time the traces of the original inoculation had been gradually but slowly subsiding. First the swelling disappeared, then the true marking of the knuckle began to reappear, and lastly, the deep brown stain of the skin of the finger passed away, and with its disappearance the patient looked upon himself as quit of the disease.

Not only was the disease not recognised for at least three weeks after inoculation, but the serious nature of the attack was never really realised. The later symptoms were never properly associated with the original disease either in conception or treatment.

A few doses of prot-iodide of mercury, a few doses of iodide of potassium, a slight course of mercurial vapour baths, and a slighter course still of mercurial inunction, formed the whole of the treatment adopted.

In the early part of December, 1870, two years after all traces of the previous attack had passed away and had been forgotten, he began to experience feeling of coldness and want of distinct sensation at the soles of the feet. On rising from a chair the impression of the chair at the back of the thighs would still continue and be accompanied by a feeling of "pins and needles" down the legs.

Towards the end of the month a sudden and severe attack of pleuritic pain, very much like that experienced in the September of 1866, set in, and lasted for a day or two. This was relieved by violent exercise and a free application of aconite liniment

On the 25th (Christmas day) the coldness and numbness of the feet became so great that no amount of stamping or walking about could shake it off. These sensations were attributed to the intensely severe frost that prevailed at this time.

Late at night, upon suddenly looking up from the book he was reading, he became aware that he could not see the pictures on the opposite walls. When these became visible, as they did after looking at them for a few moments, on returning to the book the print was invisible. The eyes had lost the power of rapidly focussing objects at different distances.

On awakening next morning he became conscious of a general disturbance of sensation. Everything seemed strange and out of order, an air of unreality pervaded all things, and he felt as if he were walking in a dream. On going out into the streets the confusion was greatly increased, and he was then first conscious that everything he looked at became double. Against the advice of the physician on whom he called, and who recommended him

to go home and keep quiet, he went about the whole day, but found his ankles constantly knocking against each other, and that his walk kept merging into a kind of running trot.

The next day he was unable to leave his bed, and the following symptoms existed:—There was double vision; pricking, burning sensations in the palms of the hands and soles of the feet, these latter feeling as if they alternately dilated and contracted. Sensations of pressure, as if some one was ramming a fist between the legs, or pressing with the palms of the hands over the front of the thighs above the knees.

In a few days all these sensations and disturbances passed away, and there remained numbness of both arms and hands, greater on the left side, less on the right; numbness of the outer aspects of both legs and feet, involving especially the two outer toes, greater on the left side, less on the right. A cord-like constriction existed round the waist, accompanied by great general prostration and loss of power. There was a slight sense of uneasiness in the spine between the shoulder-blades, but no pain or tenderness on pressure, or on the application of a hot sponge. Though the attack was supposed to be possibly due to syphilitic causation, the medical attendant rather inclined to attribute it to over-exertion and exposure to extreme cold. The treatment adopted was, rest in the recumbent position, counter-irritation to the spine, bromide and iodide of potassium, and afterwards Liq. Hyd. Perchlor. and potash.

In about three weeks' time he was enabled to leave the bed and crawl into the drawing-room on the same floor. There still persisted the sensation of constriction at the waist, and numbness of the left arm and outside of both legs. The bladder required a long time to empty, and the fæces were not felt when passed. The muscles of the right side of the abdomen were visibly more active in any effort at straining. With the aid of objects within reach he could walk about, but could not balance himself well, especially if the eyes were closed.

At the end of February (1871) he went to Bath for change of air, at which time he was still taking iodide of potassium in increasing doses. Whilst there, one morning, as he was preparing

to go out, he was seized with a feeling of pins and needles in the legs, followed by a sense of sudden dissolution. The muscles of the face commenced an involuntary twitching, and he fully thought he was dying. Upon the advice of the medical attendant, who, though he considered the attack he was suffering from was the effect of syphilis, recommended him to leave off all specific treatment, he commenced a course of tonic treatment and building up.

In March he went to London, and saw Mr. Berkeley Hill, who recommended him to Dr. Russell Reynolds as being an all-round physician, not likely to be biassed by any speciality view of the case.

At this time he was still very cachectic and feeble. He could walk with the aid of a stick to steady himself by, but the walk was very flat-footed and wanting in elasticity. The legs had a kind of independent movement, making the walk jerky and strutting. There was still numbness of the legs and left arm, constriction, and partial inability to balance the body with the eyes shut. Dr. Reynolds, who examined the eyes with the ophthalmoscope and pronounced them all right, recommended $\frac{1}{10}$ grain doses of biniodide of mercury three times daily, to be continued for a long time, and if no improvement took place, advised him to go to Aix-la-Chapelle and consult Dr. Wetzler.

The biniodide was continued for nearly three months without any appreciable change, and was then given up. He now went to Wales, and took a cottage on the side of a mountain overlooking the sea; and while there, and under the influence of no treatment, had a relapse in the shape of a sudden loss of strength and spirit. From this time till September he resumed the iodide treatment; but he was constantly having attacks of sudden loss of power, usually coming on at intervals of three weeks.

In September he went to Aix-la-Chapelle, and saw Dr. Wetzler, who was decided and emphatic. His advice was, mercury—for weeks, months, or, if necessary, for years. He was at once put on a course of mercurial inunction; about half a drachm of the strong mercurial ointment being rubbed in each night, and washed off in the morning by bathing in the waters of Aix-la-Chapelle. So weak and miserable was he at the time that he had scarcely the courage to continue the treatment; nevertheless, he carried it out

for a month at Aachen, and for three months longer after reaching home. No sign of salivation manifested itself, and there was a gradual general improvement.

On the 19th of May (1872), on awakening, he found himself again suffering from double vision, sudden loss of power, increased numbness of the left side, difficulty in walking, and great depression of spirits. In two or three days these symptoms passed off of themselves.

On June the 1st he was seized with a sudden attack of prostration, dimness of the vision at the outsides of the eyes, showers of falling sparks, and quivering of the muscles of the face. On the 13th the sight became confused; on the 14th more confused; on the 15th there was headache, and double vision again set in.

When he looked in the glass, he could see two faces staring at him—one above, and the other below and beside the other. As the head was moved about, these faces would revolve about each other in the most confusing and uncomfortable manner. Besides the upward and outward strabismus, there was ptosis of the right lid.

As this attack of strabismus did not pass away like the last, after a fortnight's rest at home he went to Ilkley, in Yorkshire, for a few weeks. No change taking place here, he was advised by his friend Dr. Scott to see Dr. McLeod of Ben Rhydding, and a physician attached to one of the hospitals for epilepsy and nervous diseases, who happened to be there on a visit.

The London physician's advice was that he should adopt a tonic treatment, consisting of phosphorus and cod-liver oil, carefully using the constant current battery. He was of opinion that the eye would right itself suddenly.

Dr. McLeod's advice was that he should give up all active employment for at least three months, and undergo a persistent course of mercurial treatment.

In passing through Leeds he called on Dr. Clifford Albutt, who considered he was suffering from syphilitic deposits, probably about the right crus cerebri. He examined the retinæ, and told the patient he was happy to be able to say there was no optic neuritis. Previous to visiting Ilkley he had resumed the iodide of potassium

and used the constant current battery, without producing any effect.

In July he took advantage of Dr. McLeod's kind assistance, and made arrangements for a three months' stay at Ben Rhydding, where he at once commenced a course of mercurial vapour baths, taking them at first daily, then on alternate days, and then twice a week, and using at first two scruples of calomel and afterwards two drachms of bisulphuret of mercury to each bath.

Under this treatment his appetite improved and his strength returned. First the lateral and then the vertical displacement of the eye began steadily and slowly to subside. The ptosis also passed off, and he was enabled to walk with greater firmness, with ease accomplishing as much as five or six miles at a stretch; he could not, however, run a single yard.

The baths were continued at home, after leaving Ben Rhydding, till the end of the year, altogether a period of six months, and not the slightest trace of mercurialisation manifested itself.

In February, 1873, a fourth attack of strabismus came on, accompanied as before with general disturbance. Some slight deposits of lymph were now seen on the vessels of the retina. A short course of mercurial vapour baths soon restored parallelism to the eyes.

Another long period of comparative health was now experienced, but was interrupted on the 6th of August (1873) by a sudden attack of neuralgia, attacking the external saphenous nerve of the right leg. On the 19th darkness of vision at the outsides, flickerings of light, pain at the top of the head, at the right side, and general loss of power came on; but there was no disturbance of the bodily functions, and the appetite remained natural.

On the 24th of December another sharp and sudden attack of neuralgia set in again, affecting the external saphenous nerve of the right leg, and again also coming on in the night, during sleep. This attack lasted ten days. The pain was of an explosive, tearing character, sometimes like sudden flashes of electricity, and so intense as to be almost unbearable. It usually occurred about five o'clock each evening, and lasted on and off till the next morning.

On the 29th the nerves of the left leg and arm became affected. Sleep was only obtainable by the subcutaneous injection of ¼ gr. of morphia once or twice in the night. The mercurial vapour baths were this day resumed, and on the 1st January, 1874, the pains began decidedly to diminish; a sense of prickling in the foot, as if a shower of fine hailstones were falling over it, taking the place of the pain. On the 2nd there was still greater improvement, but the right pudendal nerve became affected, and he again experienced the sensation felt at the commencement of the illness in 1870, as if some one were pushing a fist between the legs.

This attack, like many of the others, after passing off left an increased sense of numbness in the left arm and at the outside of the legs, increased feeling of pressure round the waist, great heaviness of the legs in walking, and a slight sensation as of a thin layer of water cushion at the soles of the feet.

On January 23rd, 1874, there appeared on the right forearm a dark copper-coloured irregular blotch of scaly eruption, about the size of a shilling, and on the arm, above it, a round circumscribed brown papule; on the thigh also there began to appear numerous small circular patches of scaly and non-scaly eruption.

With the exception of acute ephemeral nerve pains quite dissecting out the various nerves of the legs—a more or less persistent symptom throughout the whole attack—an interval of three months' comparative health was experienced, followed by a sudden intense depression occurring in the middle of the night of May the 8th. Flickerings of light and hemiopia again supervened, and on the 26th great disturbance of the sense of hearing. Sounds as if some one were jumping on the floors of the rooms above, and causing the windows to bulge out, with a constant buzzing and drumming noise, were heard. In spite of general constitutional and tonic treatment great debility persisted, and culminated, about the beginning of July, in a sudden loss of power in both legs, the right becoming especially numb and heavy. So great was the feebleness that he could not stand without a stick or catching hold of something, and getting up and down stairs was a matter of difficulty. When standing there was experienced a sensation as if the two legs were gradually gliding away from each

other, and the impression was only corrected by looking down at the feet and seeing that they were still in the same position. While walking the knees, sometimes one and sometimes the other, would suddenly give way, and once or twice he was brought to the ground from this cause. Quinine, nux vomica, with and without iron, iodide of iron, and iodide of ammonium, were severally tried without any effect, and resort was at last had again to the mercurial vapour-bath, with the result of immediate and steady relief.

At the beginning of August the patient went to Mr. Cuff's establishment at Woodhall Spa, Lincolnshire, and commenced a course of bromo-iodine baths and waters. Under the influence of one mercurial bath weekly and the Woodhall Spa waters, his general health and powers of locomotion have greatly improved, and at present he is able to follow his ordinary professional duties, simply suffering from an occasional neuralgic attack and inability to convert a walk, however fast, into a run.

Case 2.—H. G—, aged 42; tall and spare; not over temperate. In the August of 1871 was seized with a pain in the left leg and knee, accompanied by great general depression. He sought advice, and was considered to be suffering from rheumatism. Two or three weeks after, whilst in bed, he was again attacked with a sharp pain, commencing in the big toe of the left foot. The pain ran up the leg to his head, and was followed by a violent epileptic fit, in which he struggled and fought so much that it took four or five men to hold him down. In the fit he screamed and bit his tongue. On coming to himself, he found the left side of his body numb and dead. For some time he was very weak, and occasionally faint, but recovered in a month sufficiently to be able to work. On the 1st January, 1872, he was attacked with another epileptic fit, having a few days previously suffered from slight headache and constant pain in one spot at the left side of the head.

He was now ordered large doses of bromide of potassium, which gave great relief to the irritability of temper from which he suffered, and also to the constant violent jerking and twitching of the left arm and hand which he experienced.

Suspecting the possibility of syphilitic causation, large doses of iodide of potassium were now given; but as the patient became decidedly worse under the drug it was discontinued, and the suspicion of the specific nature of the disease discarded.

On the 28th of February another fit took place, and he became quite insensible. In this state he remained for several days, becoming hourly weaker. Whilst those about him were watching for his death he began gradually to change, became conscious, and revived. Upon examination his head was found to be lumpy and tender to the touch, and he was then placed on ʒj doses of Liq. Hyd. Perchlr. ter die. A marked improvement soon set in, and towards the end of April he went away for change of air, and on his return he resumed his employment for the rest of the year.

On the 13th of January, 1873, he was again seized with pain in the head, and fits not quite so epileptiform in character.

The left eye-ball became gradually extruded from the socket, and the sight on that side almost lost. There was upward and outward strabismus and ptosis. The left leg and arm also became partially paralysed. The protoiodide of mercury was now given, and afterwards large doses of the Liq. Hyd. Iodid. Arsenici; and under this treatment the eye gradually subsided into the socket, the sight returned, the paralysis of the third nerve and of the left arm and leg passed off, and he was enabled again to resume work.

In the January of 1874 he was affected with a pain in the back and down the front and outside of the legs, especially the right side. There was tenderness on pressure at the right side of the sacrum. The left leg and arm were slightly numb, and the tread with the left foot flat and heavy. There was facial paralysis of the left side and deafness of the left ear.

For some time past he had ceased all treatment, and he could not now be induced to resume it. He occasionally has slight attacks of twitchings of the limbs, but he is able to get about and follow his employment. His scalp is covered with nodules, more or less tender to the touch.

We have here in Case 1 a typical case of syphilis. From the

first moment the characteristic nature of the disease, the tendency to fibro-plastic deposit, is well marked in the large and permanent induration at the point of inoculation. There is also well exemplified another marked feature of the disease; indeed, a feature that is quite diagnostic, that is, the grouping or arrangement of symptoms. As a sonnet or ode is recognised by the number of its lines and the peculiar arrangement of its poetic expressions, so syphilis is distinguished from all other diseases by the grouping and arrangement of its symptoms. In themselves they possess no individuality of character and are common to many other diseases, but in no other disease is there the same sudden appearance, disappearance, and reappearance of symptoms. No prediction can be made as to the when, the how, or the where of the lesions. To use a musical simile, the metre is neither long nor short, but irregular. This flightiness of symptoms as existing in the later phases of the disease is well illustrated in Case 2.

If we classify the symptoms of Case 1 on the basis of treatment according to Dr. Broadbent's dictum, we are bound to consider the whole from first to last in the category of secondary symptoms, as they were always relieved by mercury and never by iodine. If we do this we are forced to consider late nerve lesions (evidently due to deposit of fibro-plastic lymph) as secondary symptoms. But such deposits and their lesions are distinctly classified as tertiary symptoms. We are therefore on the horns of a dilemma, and we are driven either to repudiate Dr. Broadbent's classification or his treatment.

If we interpret this case on the theory that syphilis is a fever of which the tertiary symptoms are the sequelæ we are equally in a dilemma, for we have then to accept the possibility of a fever not of weeks or months, but many years' duration. But supposing we only consider the first part of the attack as the fever and the second and later manifestation as the sequelæ, we still have to admit the possibility of a fever passing off and its sequelæ coming on after an interval of two years' perfect health, while one of the eruptions of the fever, the scaly and papular rash, manifests itself four years later still.

That in some respects the disease resembles a fever and is

occasionally, but not always, ushered in by febrile symptoms is true, but to make one disease the analogue of the other is incorrect and liable to mislead. The one disease is temporary, regular in its course, and definite in its duration, and to a certain extent independent of treatment. The other is irregular in its manifestations, indefinite in duration, more or less permanent, and very amenable to treatment. One circumstance, however, invalidates the comparison, and places the disease in an entirely different category, and that is its hereditary character.

From what has been adduced I think it will be admitted that syphilis is neither a fever, nor an inflammation, nor a diathesis, but a little of each. Too angular and many-sided to fit into any all-round system of classification, its symptoms may yet admit of some general plan of arrangement not entirely artificial. A blood disease due to the introduction of a living virus into the system, we have immediate functional disturbances of a septic character which might well on the basis of their causation be termed primary. The fibro-plastic condition of the blood, however, frequently produces change of tissue, and thus are originated a further series of disturbances depending on the tissue or organ which may be the seat of the deposit. These symptoms, as being of secondary causation, might also not inaptly be termed secondary. But there is yet another link in the chain of cause and effect. Deposits of nodules or small gummata in the coats of an artery may so far diminish the blood supply as to lead to the degeneration or death of the part supplied by it, or by direct pressure they may cause absorption or organic changes in structures or organs. From such causes arise softening of the brain, necrosis of bone, amyloid degeneration of organs and other lesions which are entitled to the appellation of tertiary, and are the true sequelæ of the disease. The virus once admitted into the circulation there exists the possibility of the *complete* chain of symptoms arising. Whether the disease stops at the first causation or advances to the third will probably depend on constitution and the early and persistent adoption of treatment.

Dr. Broadbent says, affections of the nervous system chiefly occur in those in whom the earlier symptoms have been slight,

transient, or absent. As these are generally the cases that receive either late, slight, or no treatment, the occurrence of secondary and tertiary lesions may perhaps be regarded as resulting not from the slightness of the attack, but the slightness of the opposition given to the development of the virus in the blood. If this inference is correct an early and efficient treatment becomes a question of vital importance.

What the treatment should be is still a matter of dispute. The weight of evidence seems to be with the teaching of Mr. Jonathan Hutchinson,—that while the system is under the direct influence of the poison mercury is the remedy.

Whether mercury destroys the virus and is thus a true specific, or whether it counteracts the tendency to the fibroid condition of the fluid, is questionable, but that it causes the rapid absorption of fibro-plastic deposits and modifies the course of the disease is beyond dispute.

When the tissues are the seat of a more permanent and indurated deposit iodine seems to be more efficacious; also in those later stages of the disease where the true inflammatory condition of the blood has given way to degenerated state. Frequently the presence of tissue change and blood poison may coexist, and then perhaps a combination of the two drugs may be more useful than either alone.

The tertiary lesions, unlike the primary and secondary, being permanent and organic, of course admitted of no specific treatment.

ON THE TREATMENT OF SIMPLE FRACTURE OF THE SHAFT OF THE CLAVICLE.

By FRANCIS VACHER, Birkenhead.

The fracture which commonly results from a fall on the shoulder or other form of external violence applied directly or indirectly to the acromial extremity of the clavicle, is of such frequent occurrence* it must often engage the attention of most members of the profession, not excepting those who see comparatively little surgical practice, and yet how to put it up with a fair chance of obtaining a perfectly blameless union is a question which has not hitherto been satisfactorily answered.

As a rule, it is singularly easy to diagnose, for, as Mr. Syme says, "the pain, swelling, mobility, and crepitus of the broken part, which is usually about the beginning of the acromial curvature, readily betray the injury, which is rendered still more obvious, by the sternal extremity of the bone being drawn up by the sterno-mastoid muscle, and the shoulder being depressed, brought nearer the sternum, and rendered more prominent forwards by the action of the *pectoralis major* and *latissimus dorsi*, assisted by the weight of the limb." No less easy is the treatment theoretically, the indications being briefly to raise the acromial portion of the bone to a level with the sternal, and retain it *in sitû* by keeping the shoulder drawn upwards and outwards and backwards, but these indications are exceedingly troublesome to fulfil, as is evidenced by the many ingenious and complicated contrivances designed for this purpose, and the admitted inefficiency of even the best of them.

* According to the statistics of the Middlesex Hospital, as given by Messrs. Flower and Hulke, in Holmes's 'System,' vol. ii, compiled from the experience of sixteen years, the clavicle is more frequently broken than any other single bone.

The objection to Desault's method, tying a cushion in the axilla, binding the arm down over it and elevating the shoulder by a bandage passed under the elbow, is, to quote Syme again, that "when the cushion in the axilla is secured so high and so firmly as really to serve the office of a fulcrum, it compresses the nerves and blood-vessels beyond endurance, and if it be allowed to descend so as not to do this, it increases the distortion, by separating the arm from the side," a remark which appears to be equally applicable to Liston's modification of this plan, figured in his 'Practical Surgery' and in Miller's 'System.' Dupuytren, also, writing of his experience of Desault's apparatus, states, "A great many patients could not support the constriction of the chest which it involved, without experiencing a sense of suffocation more or less distressing; in other instances, this pressure occasioned inflammation, and even sloughing, but almost invariably it was attended with intolerable pain." Besides, the bandage surrounding the chest is very apt to slip and require frequent readjustment, even when carefully stitched along the front and back over the axillary pad, as recommended by Mr. Christopher Heath; and the use of dextrine to render it immoveable, proposed by M. Blandin ('Medico-Chirurgical Review,' Oct., 1846) or starch, or any kind of plaster, is in many cases directly contra-indicated.

Boyer's plan of treatment (this surgeon fastened a thick pad in the axilla, and fixed the arm and kept it close to the trunk by lacing to the lower part of the limb a piece of quilted cloth furnished with four straps corresponding to as many buckles on a linen waist-belt or girdle), though it does not compress the chest, and is not liable to slip, is in other respects as imperfect as Desault's.

Intrinsically the same as Desault's also is the apparatus devised by Dr. S. H. Coale, of Baltimore, noticed in 'Cooper's Dictionary of Practical Surgery,' and Ellis's well-known apparatus, consisting of a crutch, with chest-belt and shoulder-belt to keep it in position.

The extremely simple mode of putting up this fracture described by Velpeau seven-and-twenty years ago ('Gaz. des Hôp.,' No. 115), *i. e.*, raising the patient's hand up to the sound acromion,

the affected shoulder being thus forced backwards and upwards, and bandaging from the axilla of the sound side across the back to the broken clavicle, then round and round over the arm, and finally covering the whole with a layer of dextrine-moistened bandage; whatever merits may be claimed for it, is defective in so far as it only fulfils two of the three essential conditions required. Mayor's sling, and Mr. J. Duncan's curiously shaped jean contrivance, have the same faults.

Fastening the forearm, semiflexed, behind the back, as proposed by M. Pelissière, and the recommendation of Professor Gordon ('Dublin Quart.,' 1859), to extend the injured arm downwards over an axillary pad and firmly bandage it to the trunk, permanent extension being kept up by means of a band fastened above to the forearm, flexed at right angles, and below around the perineum or thigh, would seem to be equally objectionable.

The treatment by figure-of-8 bandage, by two handkerchiefs tied round the shoulders, looped into one another and tied together across the back (as shown in 'Druitt'), by the clavicle bandage, of which there is an illustration in Sir Astley Cooper's 'Treatise on Dislocations and Fractures of the Joints,' by padded shoulder-belts with or without Mr. Simpson's sleeve addition referred to in Fergusson's manual, or by the T-shaped back splint, though certainly more likely to prevent deformity than Desault's or Velpeau's or allied apparatus, labours under the disadvantage of being very ill borne.

It is hardly necessary to allude to such antique inventions as Heister's iron cross, the leather strap suggested by Brunninghausen, or the corselet of Brasdor. The latter appears to be the only one of the three ever appreciated by English surgeons, and they are all, as Boyer tells us, modifications of the figure-of-8 bandage, and not a bit better.

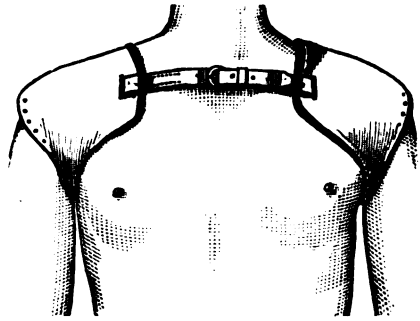
Mr. Bryant, summarily disposing of the ordinary methods of treatment by remarking that "the old plan of fixing the pad in the axilla and the figure-of-8 bandage is a delusion, and a very uncomfortable one," recommends placing a pad over the blade of the scapula below its spine, and binding this bone firmly to the thorax by broad strips of strapping obliquely encircling half the

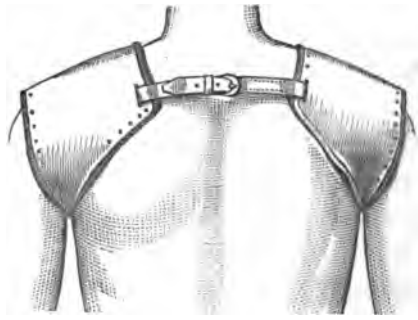
chest, at the same time supporting the affected arm in a sling, drawing the hand upwards towards the opposite shoulder; a plan which differs little from Velpeau's, and is clearly chargeable with the same failing.

Indeed all the divers suggestions, ancient and modern, for treating this fracture, and I have hardly named a tithe of them, are probably with very few exceptions modifications or combinations of the four representative treatments, the figure-of-8 bandage, Desault's, Velpeau's and that oldest, simplest, and best means of dealing with the injury (if only patients could be induced to submit to it) treatment by the recumbent position in bed. Now, as neither Desault's nor Velpeau's nor similar appliances keep the acromial fragment of the clavicle in the position requisite for obtaining regular union, and as very few people are so far masters of their own time as to be able to spare two or three weeks in bed on account of a broken collar-bone, most surgeons sooner or later have recourse to some form of apparatus on the principle of the figure-of-8 bandage. The tightness, however, with which it is necessary to apply this bandage is almost certain to produce excoriation, especially of the free margins of the anterior walls of the axillæ; and even when soft silk handkerchiefs, quilted fillets, or well-stuffed shoulder-belts are used in place of a plain bandage, the galling is often so severe as to become intolerable.

Having, after repeated trials of Desault's and other apparatus, been disappointed with the results, and found that when my patient was an adult and the fracture between the attachments of the *sterno-cleido-mastoid* and *deltoid*, it was impossible to prevent the inner fragment from over-riding the outer except by bracing back the shoulders, and yet that any purely annular pair of shoulder-clasps, from which to effect the needful retraction, were for the reason given unsuitable, it occurred to me that metal caps which would take a firm hold of each shoulder might accomplish the object sought.

Accordingly, I had made for me, in March, 1872, the simple apparatus here figured. It consists of two sheet-tin shoulder-pieces or caps, soldered at the most dependent parts, where they are strengthened by stout brass wire over which the tin edges are





turned. They are carefully shaped to fit the parts they grasp, having been constructed from a gutta-percha pattern I took great pains in preparing, are lined with wash-leather quilted over thick felt, and are connected together by straps and buckles as seen in the cuts, the anterior strap and buckle being merely to keep the caps from tilting.

Each cap measures five inches across the top, and a trifle broader where the straps are attached; the free margin directed inwards is twelve inches, that directed downwards and inwards fourteen inches, and the circumference taken at the outer border sixteen and a half inches. The weight of the pair inclusive of straps, padding, &c., is just twenty-four ounces.*

* In my zeal to have the shoulder-joints firmly laid hold of, I am conscious I have made my caps needlessly clumsy; thus they project outwards nearly an inch and a half more than is necessary, and are undesirably full in the front, so that an equally efficient and much lighter apparatus might easily be contrived.

They are exactly accommodated to the size of the patient's shoulders by adding to their lining one or two layers of lint, and the cavities of the axillæ are filled in with pads to any required thickness by winding long strips of lint round the soldered portions of the caps. The pad on the injured side, being always made fuller than on the sound side, though it cannot press unduly on the contents of the axilla, is a very efficient fulcrum over which the head of the humerus is drawn, carrying the scapular and external fragment of the broken bone outwards. Bracing the shoulders back by means of the posterior strap and buckle, and supporting the forearm on the injured side by a handkerchief suspended from the neck, completes the reduction of the fracture, and fixes the acromial fragment of the clavicle in the position attained. When the scapula is not sufficiently bound down by the posterior plate a small pad may be introduced beneath this part of the cap. As regards the anterior strap and buckle, it is perhaps best to fasten it loosely as soon as the caps are imposed, and readjust it after the retraction of the shoulders.

I am prepared to hear that my apparatus is but another addition to the many trifling modifications of approved methods of treatment such as have from time to time sought to attract the attention of the profession since the days when Ledran, David, and Moscati were the recognised authorities on the putting up of clavicular fracture. It is not contended the appliance is more than this. All I claim for it is that if it be skilfully employed it will place and retain the acromial half of a broken collar-bone in a position very closely approaching its position before fracture, without galling the patient's skin, compressing the axillary contents, or interfering with the free action of the chest; and those who have hitherto felt the want of something to do this I am confident will welcome my suggestion.

I have used the instrument in several cases, the subject in each instance being a strong muscular man, and although such force was used in putting up one patient that after two or three days one of the caps broke at the soldering, the pressure had not been complained of as very painful, nor was there physical evidence of it. But, of course, traction, which would be quite intolerable when

exercised on a line, may be almost unfelt when made on a broad surface.

If a surgeon were to attempt to reduce a simple fracture of the clavicle by drawing the shoulders back with his index fingers only, he would distress the patient and yet fail to accomplish his object; reducing the displacement, however, is not hard if he firmly grasp a shoulder in each hand. Thus it is all text-books tell us reduction of this fracture is easy, but keeping it reduced is difficult. In other words, what it takes two hands to draw into position can scarcely be maintained there with two narrow fillets.

As I have found the weight of the slung arm generally sufficient to keep it fairly well at the side, the patient can wear his shirt and a loose coat while under treatment; and as often as required he may be laid on his back, and the axillary pads withdrawn and renewed. The apparatus is, therefore, exceptionally cleanly and comfortable, and, I assume it will be conceded, neither complicated nor likely to be very costly.

In conclusion, I may remark that though the shoulder-caps do not altogether prevent the mobility of the sternal fragment of the clavicle, they, in common with all modifications of the figure-of-8 bandage, restrain it somewhat, and if the patient be directed to keep his face turned a little towards the injured side for the first few days, no deformity need be feared from this cause.

OVARITIS.

By FRANCIS IMLACH, M.B., Liverpool.

A recent essay by Dr. Matthews Duncan,* though in small compass, gives a most complete clinical picture of this disease. The present paper is based on a limited number of cases I have myself observed, and includes only such parts of the subject as I have as yet been led to study in connection with them. It proceeds on the assumption that the disease is one which may usually be detected by physical examination, but not by consideration of symptoms; and it dwells chiefly, though not entirely, on its frequent association with similar disease of neighbouring parts, and on the difficulties and doubts met with in actual diagnosis. Two important parts of the subject are excluded, the etiology and the pathological varieties of the inflammation. What may be termed a popular account of the etiology has so often been given in the books that repetition is needless, and any more scientific description is scarcely possible. Of the pathology of the disease I am unable to speak confidently from want of sufficient experience. But this only may be noted, that the term ovaritis, when used in a clinical sense, includes and often confounds the pathological states of congestion and inflammation; that it does not usually imply abscess, and that the congested or inflamed ovary is often notably increased in size. Kiwisch and West say it is extremely unusual for the ovary to be enlarged by inflammation of its stroma to more than double its size; but, as has been remarked, these post-mortem results do not afford an accurate limit of size for the living organ. It is, in fact, extremely difficult to fix such limit, and as we have no good comparative study of congestion and inflammation in different organs there is no analogy to guide us.

* 'Edin. Monthly Med. Journal,' August, 1871.

The symptoms of ovaritis are, so to speak, vague and unsatisfactory, yet they are of great practical importance, and are the chief clinical test of acuteness and chronicity. There is probably always pain during, at least, some part of the course of an ovaritis. It may range from slight general pelvic discomfort to intense agony at a single spot; and while the former perhaps accompanies well-marked simple ovaritis of one side as shown by examination, the latter is associated with nothing abnormal that is discoverable by like means. Indeed, for these latter cases Dr. Churchill* has suggested the term 'ovarian irritation,' implying intense ovarian pain without corresponding change of structure—simple neuralgia. His paper is a companion picture to that of Gooch on 'Irritable Uterus.' Some such phrase is useful and may be held to include cases of inflammation of the ovary or other parts which we are unable to diagnose, and perhaps some others. Aching in the back, shooting pains in the thigh on the affected side or even the other, a peculiar sickening sensation in the region of the inflamed ovary, often well brought out by pressure during examination of a recent case, pain at the os uteri, dysmenorrhœa, dysuria, painful defæcation,—all these and others of more doubtful significance are found variously associated in different cases.

"In the menorrhagia," says Dr. Duncan, "if it may be so called of ovaritis, the flow is not excessive within any stated time, but is long continued. Besides, bloody discharge may take place at irregular times. These so-called disorders of menstruation appear to be among the most characteristic phenomena of ovaritis." This is an apt account of the menstrual discharge in the majority of the cases with which I am acquainted. In some instances there is a history of such an amount of uterine hæmorrhage at the commencement of the painful symptoms that one is left in doubt as to whether or not there has been early abortion.

The frequence of abortion during ovaritis has been ascribed to increased reflex nervous irritation, but this is little else than a crude schematic adaptation of physiological theory to pathology; there is little positive evidence of such increase, and no limitation of

* 'Dublin Quarterly Journal of Medical Science,' July, 1851.

the doctrine by exact observation or experiment. The effect of inflammation of the ovary upon its nervous relations is practically unknown. Hysteria is said to be frequently associated with ovaritis, but was not, I believe, well marked in any of my cases. I have seen in my father's practice a lady in whom, a few months after a severe confinement, exophthalmic goitre occurred simultaneously or nearly so with an acute ovaritis diagnosed on pelvic examination by a London practitioner. It is, however, impossible to say whether the ovaritis was merely coincident with or a cause of the Grave's disease, or finally one of its more manifest signs, like the bronchocele and exophthalmos.

The frequent association of ovaritis with similar pathological states of other pelvic structures, amply proved by clinical and post-mortem examination, shows it to be so many times a part only of a more generally diffused disease. Indeed the inflamed ovary seems to have, in ordinary, no such highly differentiated pathology as its physiology would lead us to expect. Its grand function of ovulation appears to impress the inflammation with few notably peculiar conditions as to intensity, duration, or course; and it is said the function may be performed and the uterus carry the ovum to full term, while both ovaries are considerably inflamed. Moreover association in disease seems to be determined not so much by association in development as by proximity in position. Peritonitis and congestion or even inflammation of subjacent organs and tissues constitute the elementary pathology of these allied diseases. Contractions and adhesions sequent to such peritonitis, and according to its character primary or secondary, direct or by connecting bands, cause constrictions, displacements, and distortions of the subjacent parts. Hence associated with ovaritis we find matting of intestine, inflammation of the various pelvic viscera, adhesions of an ovary to an unusual part of its broad ligament, to the fallopian tube, to the fundus, side or posterior wall of the uterus, even to the ovary and broad ligament of the opposite side, involving extensive displacement of both broad ligaments and fallopian tubes,* flexion of the uterus, its adhesion to the sacrum &c. Dr. Duncan doubts the frequent

* A case is described by Dr. West in 'Diseases of Women,' 3rd ed., vol. ii, p. 45.

association of inflammation of the pelvic cellular tissue with ovaritis.

Among twelve cases which I observed and noted while house-surgeon at the Lying-in Hospital of Liverpool, the right ovary alone was affected in five, the left in four, and both together in three. The uterus was normal in three cases, retroflexed in three, anteflexed in two (the ovary being fixed to its posterior wall in one of them), and was once fixed low in the left of the pelvis, once procident (in a young woman), and once enlarged with fibrous tumour. Another case, with the post-mortem examination, I shall narrate at length later on. The histories of these women were not sufficiently reliable to allow of any definite statement as to their fertility. While some had only abortions or miscarriages in rapid succession, others had only viable children at long intervals.

One complex case, easy of diagnosis and ending in recovery, will be given in some detail to illustrate the disease. With it may be compared Dr. Churchill's widely known case of recurrent retroflexion of the uterus at each menstrual period, and Mr. Lawson Tait's * case of uterine retroflexion associated with double ovaritis. It is, shortly, a history of ovaritis and of a uterus retroflexed after each menstrual period while the ovaritis lasted, with such irregularities as repeated clinical investigation discovers in the course of all diseases.

Mrs. A. W—, æt. 25, married four years; one child soon after marriage, premature but still living; no miscarriage. Nearly two years after marriage had an almost constant red discharge for three months, and during a week of this time her urine was drawn off through a catheter. Twelve months afterwards was laid up with rheumatic fever for eight weeks, since which time, but especially during the last three months, she has had constant pelvic pain and feeling of weight. Menstruation occurs every month, lasts eight days, and of late especially has been profuse. Two days before its occurrence the pain, chiefly in the left lower quarter of the belly, so increases that she takes to her bed; during the first day of its occurrence the pain remains as bad as ever, but lessens considerably on the second.

* Hasting's Prize Essay, 'British Medical Journal,' 1874, p. 735.

October 26th, 1872.—Some ill-defined dulness in the left inferior quarter of the abdomen. *Per vaginam*, the left ovary, though but little enlarged or displaced, is readily felt; it is extremely tender, and when pressed there is increase of the peculiar pain of which she complains. The right ovary cannot be felt. The uterus is mobile but retroflexed; pressure on the cervix so as to increase the flexion causes pain of a kind entirely different from that usually experienced; a well-bent sound enters backwards two and a half inches, and is reversed with difficulty and with pain to the patient.

November 13th.—Pain about navel so great that she keeps in the bent posture; left ovary mobile and in the same condition as before as regards size, position, and tenderness; uterus felt to be not retroflexed, but the sound was not passed.

30th.—In the region of the left ovary and fixed to the left side of the pelvis is now a tumour the size of a small orange, hard but to some extent indentible by the finger, and tender (in part, probably, matted intestine); uterus mobile and not adherent to the tumour; sound easily enters in the normal direction for two and three quarter inches, and its introduction causes no pain.

December 6th to 12th.—Menstruation with considerable but scarcely profuse discharge; pain greatly diminished.

14th.—Adherent left ovary much smaller than on last examination, harder and less tender; uterus pushed to the right and completely retroflexed; its fundus is easily replaced by the finger, but again descends when the support is removed; the sound, passed four days after, demonstrates the retroflexion,—length of uterus nearly three inches.

January 1st, 1873.—Expects to menstruate in a week; left ovary still to be felt, but is not enlarged and has little tenderness; uterus mobile and not retroflexed; sound enters fully three inches.

February 7th to 13th.—Menstruation.

19th.—Left ovary distinctly felt, mobile and somewhat more tender than formerly; uterus mobile and retroflexed; sound enters three inches and easily rectifies the position.

March 5th.—Expects to menstruate in a week; has been

suffering from severe bearing-down pains like those of labour; left ovary as before, mobile and tender; uterus acutely retroflexed, the fundus tender, and when pressed the pain she now suffers is increased.

26th.—Ceased to menstruate a fortnight ago; still much occasional pain; left ovary not to be felt; mobility of uterus restricted and only very slight retroflexion or none at all; sound enters three inches in the normal direction. Pelvic tenderness during examination is much diminished.

April 9th to 12th.—Menstruation; only three days, therefore, instead of eight or nine, as has been her habit; discharge profuse only on the first day, little pain before and none afterwards.

16th.—Left ovary felt as a small and nearly fixed mass, not now mobile, as formerly, not so distinctly differentiated, and not acutely tender; uterus not retroflexed and not tender.

Of course the patient was treated. She had bromide of potassium, bichloride of mercury, henbane, and aromatic spirits of ammonia in their turn; but for my part I prefer to regard the case simply as a piece of natural history.

I am unable from want of sufficiently definite observation to speak at length of the differential diagnosis of ovaritis from affections of the fallopian tube, inflammatory thickening of and cysts in the broad ligament, an inflamed small ovarian cyst or pedunculated subperitoneal uterine fibroid. The probability of error and its direction can only be guessed at for each individual case from its history, any peculiar results of examination, and from the personal liability to error from insufficient experience and delicacy of touch, and from preconceived opinion. I shall add, therefore, only a few general propositions concerning diagnosis.

It is of peculiar importance, indeed almost essential, that the bladder and rectum should be empty. It is rare that an ovary can be detected by simple palpation of one or other inguinal region. Vaginal examination is almost solely digital, though the sound sometimes assists in exhibiting the mobility of the ovary about the uterus. The normal position of the ovary is at the side of, but a little posterior to, the uterus, and between pelvic planes through its fundus and middle; but the lateral pelvic wall,

anterior to the synchondrosis and below the brim, is a safer guide. A mass from the size of a filbert to that of a walnut, in this region, is probably an ovary, especially when there is evidence of absence of fibroid growth of the uterus. If, in a young woman, such a mass can be felt by ordinary vaginal examination, that in itself is presumptive of ovaritis, and if it is acutely tender the diagnosis is made. In older women one ovary or even both may sometimes be felt by the finger, freely mobile and not enlarged or tender; this is no evidence of ovaritis, but demonstration of its absence. Adhesions greatly perplex diagnosis. Where a little-enlarged ovary is adherent to the side of the pelvis, with some inflammation in its vicinity, often no positive conclusion can be arrived at while that condition lasts. When the ovary seems to adhere to the uterus so that both move together and not one about the other, fibroid enlargement or flexion of the uterus are sources of doubt and occasions of error. Only a rough estimate of the size of the mass need be attempted. If the mass is granted to be an inflamed ovary, then that part of its outline which is traced by the finger over the wall of the vagina together with the freedom of its mobility (when non-adherent) yields a tolerably precise result. Often, too, by manual pressure from above or by the patient's involuntary efforts, the ovary is made to descend within easy reach. Combined external and internal examination is invaluable in showing that the supposed inflamed ovary is not only a knob or projecting part of a much larger mass, for example, an ovarian tumour, but is no fine measure of the size of the inflamed organ. The conditions of nicety are obviously absent; the abdominal wall may be from one to four inches thick, and the vaginal wall about half an inch; these two are several inches apart, and considerable force must be exerted to appose them; hence the ovary, say about the size of a shelled walnut, even if accurately adjusted between them, cannot be accurately gauged. While detection of an ovary in its natural position proves a mass elsewhere not to be that ovary, failure of such detection does not prove any ovarian displacement. With an ovary in Douglas' pouch pretty accurate measurement is possible by combined rectal and vaginal examination. Here the

organ is more within reach, the rectal and vaginal walls closely envelope it, their thickness is less, their pliability greater, and there is no tension of their attachments.

Another case, complex, difficult of diagnosis, and terminating fatally, will illustrate another phase of the disease.

M. A. M.—, æt. 33, married twelve years, four children; about ten weeks previous to examination had a so-called flooding which lasted several weeks, stopped for a fortnight, and then recurred. When I first saw her she had no discharge, but was troubled with dysuria and with great pains through her sides and back. The uterus was displaced slightly backwards and fixed by surrounding fulness. The infra-vaginal portion of the cervix was almost lost in the general succulence, and was tender but less so than the anterior swelling. From the anterior and right side of the uterus a firm ridge curved outwards and backwards; the finger could pass further along its posterior than its anterior wall. On the left side was a similar ridge, not so well marked nor so tender. The patient lay for eight weeks and then died. At the necropsy extensive old pleuritic and pericarditic adhesions were found. There was an encysted abscess in the right pleura containing from four to six ounces of pus, and small circumscribed abscesses were scattered throughout both lungs. The heart, liver, stomach, great mass of intestine, spleen, and abdominal peritoneum were natural. The right kidney was displaced upwards and inwards, but was not floating; otherwise both kidneys were natural. Matted folds of small intestine were adherent to the fundus uteri and enclosed a perimetric abscess in Douglas' pouch. The pelvic viscera were matted together; the uterus was natural; so were the fallopian tubes at their uterine extremities, but they could not be traced to their fimbriated extremities; the ovaries were with difficulty distinguished in the matted mass; they were enlarged to the size of a walnut and were riddled with purulent cavities; in the right one was what appeared to be a recent corpus luteum; the left broad ligament contained pus, the right one had inflammatory thickening but contained no pus; growing from the posterior surface of the left broad ligament was a ruddy papilliform body, the size of a large pill; the round ligaments were not affected;

the rectum was much thickened, and of gristly consistence; the bladder was not materially affected.

This case exemplifies the frequent necessity of giving an *open* diagnosis of pelvic inflammation.

There is no plan of treatment of this disease by which a cure can be ensured or even expected within any definite period. Rest in hospital or at the sea side, &c., from household cares and from sexual life, is beneficial. Dr. Rigby says of displacement of an ovary into Douglas' pouch, "our first indication will be to rouse the liver," and this has been copied into recent text-books. Some advise the use of Hodge's pessaries. I have seen them tried, and believe they do more harm than good. Among minor remedies, counter-irritation is occasionally useful, the sharp stinging pain of a blister satisfactorily directing the attention from the dull aching and more annoying pain in its vicinity. But where the pain amounts to agony blistering only adds to it. Here opium and hot fomentations give most relief. Administration of chloral during the period of greatest agony, as for example immediately previous to menstruation, is a coarse but often invaluable means of alleviation. Active treatment of concurrent uterine disease should, I believe, for the most part be suspended. But I have seen the menorrhagia stopped for a time by swabbing the uterine cavity with solutions of carbolic acid, perchloride of iron, &c. regardless of the ovaritis and without apparent ill effect. This plan may be recommended where the flow, even though it relieves the painful symptoms, is proving exhaustive.

EAR DISEASE IN RELATION TO SCARLATINA, ETC.

By F. M. PIERCE, M.B., L.R.C.P. Lond.,
HON. MEDICAL OFFICER, MANCHESTER EAR INSTITUTION.

The present epidemic of scarlatina appears opportune for drawing the attention of the profession to the great importance of the early recognition and treatment of any secondary ear affection occurring during the progress of the fever.

Of all febrile complaints scarlatina is probably productive of a greater number and variety of sequelæ than any other, and frequently inflicts upon its victims some of the worst forms of disease with which the aural surgeon has to deal.

Of 390 cases of purulent discharge admitted under my care at the Manchester Ear Institution, 180, or 46 per cent., were due to the poison of scarlatina, and probably many more would be found to have been so produced could the history of the patients be more carefully inquired into.

Scarlatina, diphtheria, measles, tonsillitis, pneumonia, bronchitis, and pertussis, are frequent agents in the production of acute ear disease, and usually of the suppurative kind of inflammation.

With a large number of practitioners the idea that the state of the ear in scarlatina requires any care is hardly entertained, much less carried out; and yet many cases of scarlatina with marked symptoms of cerebral congestion, delirium, severe headache, convulsions, &c., owe the existence of these complications to a perfectly distinct but serious aural affection, the first suspicion of which is generally aroused by the appearance of a purulent discharge from one or both ears. In short, only when the mischief is done is it thought worth while to attend to the aural affection. My object in this paper is to point out, as

clearly as possible, and without presupposing any greater knowledge of ear disease than an average practitioner may be expected to possess, when, how, and by what treatment, ear complications in scarlatina may be best dealt with.

Dr. Roosa, in reference to acute catarrhal inflammation of the ears, says, "From the nature of things the general practitioner will see a good deal of this form of disease if he be on the look-out for it, since it occurs so often in the course of the exanthemata and in connection with diseases of the respiratory organs. It will be seen that there is nothing in the treatment of this affection that will prevent the usual care of the general disease. It is a great and often fatal error to wait the subsidence of the general symptoms before the aural ones are alleviated. They are quite as important as the most urgent constitutional disturbances. Indeed, they are often the unsuspected cause of most of the latter."

It is customary, when a patient suffering from scarlatina has symptoms of cerebral complication, to refer it to "an extension to the meninges of the brain," "feverish delirium," or some such indefinite explanation, without clearly recollecting that thereby is implied an extension of the throat inflammation through the Eustachian tube to the tympanum, producing suppuration with rupture of the membrana tympani and otorrhœa, suppuration of the mastoid process, caries of some part of the temporal bone, chiefly the petrous, pus effused on to the dura mater, inflammation of the brain coverings, and abscess in the brain substance.

The above may be and often is the usual order of attack in a severe ear affection secondary to scarlatina. In an adult the local attack will be at once felt and pointed out to the medical attendant, when the treatment to be mentioned should be adopted. It is, however, to children that I especially wish to refer, in whom this formidable disease is more frequent than in adults.

The inability to explain themselves, the great difficulty of ascertaining the degree of deafness and examining the state of the membrana tympani in children, make it all the more important to watch for any ear affection before a purulent dis-

charge has taken place. If in the course of scarlatina a child is seized in the night or towards morning with a sudden paroxysm of pain, in which it tosses its head about, pulling the hair, and attended by a violent fit of screaming, perhaps followed by convulsions, coma, or any signs of facial paralysis, we should at once have the ears examined.

The acute stabbing, darting kind of pain of acute suppurative inflammation of the middle ear is almost constant; days and nights are spent in great anguish; the cries of the child are of the most piercing description, and its attention cannot be drawn to anything about it; low moaning, restlessness, and exhaustion succeed, to be almost instantly relieved on the appearance of pus at the external meatus.

In diagnosing this aural affection from other less important infantile ailments and from primary brain disease we must especially notice the character of the screaming, whether the pain appears to be increased by movement of the child, by vibrations, by alteration in the position of the head, by loud noises, coughing, or sneezing.

In examining the ear Brunton's speculum should be used (by sunlight if possible), and the following appearances of the membrana tympani will be seen if the middle ear is already attacked. The membrana tympani is bulging outwards, of a dull leaden yellowish colour; the triangular spot of light visible in a healthy ear is absent; the manubrium of the malleus cannot be seen, but its position is indicated by a red line of enlarged vessels running backwards and downwards across the centre of the membrane, which has a moist, sodden look.

The auricle itself frequently becomes more or less tender, swollen, hot, and should the pus retained within the tympanic cavity fail to rupture the membrane it will pass on to the mastoid cells, and a red, tumefied, painful and œdematous condition of the mastoid process will be observed.

I need hardly add that the watch is heard very indifferently, and that a tuning-fork placed on the vertex will in cases where one ear only is attacked be heard most distinctly in the affected organ, but these tests will not be available for very young children.

The treatment to be adopted in cases presenting the symptoms and signs above described must be prompt and effectual. The membrana tympani should be incised through a speculum which I have designed and adapted to Brunton's. The incision should be made with a small arrow-headed lancet posterior and parallel to the membrane of the malleus, or, if the bulging be very marked, at the most prominent part.

The ear must afterwards be well cleansed by frequent warm-water douching for two or three days. The aperture thus made closes much more rapidly and completely than when the membrana tympani spontaneously ruptures; four to five days is the usual time.

Those who have not witnessed the remarkable abatement of previous alarming symptoms due to this timely operation will hardly credit the relief it affords.

Supplementary to this treatment leeches applied in front of the tragus, warm-water douches every half hour, the throat frequently brushed with a saturated solution of chlorate of potash, and the neck protected by warm poultices, will be called for should pain and discharge about the ear continue. No syringing of the ears should be permitted, but they may be filled after the use of the warm-water douche with a warm solution of sulpho-carbolate of zinc (two grains to the ounce).

One word as to the chronic otorrhœa left by scarlatina and other causes. Patients are constantly coming to public institutions for diseases of the ear and stating that their medical attendants, men of undoubted ability in their profession, have told them that "a running from the ears must not be stopped," that "it will get well as they grow older," or that it was better "not to meddle with the ears," and patients have come under my notice who have been persuaded that a discharge from the ears is a salutary drain and saves them from untold miseries. This mistaken notion cannot be too soon removed.

Whilst otorrhœa continues there is danger, and every effort should be made to arrest it if possible. Sir W. Wilde has graphically said of otorrhœa, "We can never tell how, when, or where it will end, or what it may lead to."

No authenticated pathological records can be found to support the erroneous doctrine of both profession and laity that it is dangerous to stop any running from the ears.

In conclusion, I may quote Mr. Hinton, who says, "Much less permanent deafness, even less deaf-mutism, will affect the people when the profession make it part of their duty to study the condition of the tympanum in every case of scarlatina, measles, and hooping-cough. There can be little doubt, I think, that the mortality at least of scarlatina might be appreciably diminished by treatment directed to the ears."

CASES OF DISSECTING ANEURISM OF THE ARCH OF THE AORTA.

By WILLIAM ALEXANDER, M.D. Q.U.I., and A. M. S. HAMILTON, M.D. Q.U.I.,
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The term "dissecting aneurism," first used by M. Maunier in 1802, is commonly applied by authors to that form of lesion in which the blood ruptures the internal coat of an artery, and separates the several layers of the middle coat, or the middle from the external coat to a greater or less extent. It will be evident that this definition will not include one of the following cases (case No. 3), where, although theoretically there may have been some slight separation of the edges of the opening, yet practically the rupture of the three coats took place simultaneously, and therefore left no time for the dissecting process to take place.

We will first shortly detail the symptoms of the cases, next the results of the post-mortem examinations, and lastly, we will draw certain conclusions from these, and other published cases as to the nature, causes, symptoms, &c., of this lesion.

Case 1.—T. R—, æt. 68. Had been an inmate of the Liverpool Workhouse for several months previous to his death, during which time he was employed whitewashing and doing other light work. He suffered from chronic bronchitis, occasionally coming under the notice of the medical officers when any exacerbation of the affection recurred.

On December 20th, 1872, he complained of a pain on his left side, owing, he said, to his having caught a fresh cold. He asked for a plaster, a remedy that seemed always to have given him relief; one was ordered, and he went away contented. Half an hour after, he was brought back; the pain had become more severe, his breathing was much distressed, and his countenance showed

that something very serious was the matter. He was immediately ordered to hospital. In attempting to rise from his chair, he seemed to faint, slipped from the chair to the floor, and died in less than a minute.

Case 2.—L. G—, æt. 69, an epileptic, who had been in the epileptic ward of the Liverpool Workhouse for several years. On the evening of March 31st, 1872, he complained of not feeling well; aperient medicine and rest in bed were prescribed. He, at that time, did not complain of any pain in the chest. He felt better during the night, and next morning was getting out of bed when he complained of a pain in his side, staggered, fell back partly on the bed and partly on the floor, and before the attendant reached his side he was dead.

Case 3.—S. R—, æt. 38, a sailor, was admitted to the Liverpool Workhouse Hospital, in March, 1873, suffering chiefly from severe orthopnœa. On auscultation a loud aortic regurgitant murmur was heard. Next morning he was quietly talking to a patient in the next ward, when he suddenly asked his friend to place his hand over his heart, "to see how rapidly it was going," when he sank on the floor and died immediately.

Post-mortem examination.—Case 1.—On opening the chest the anterior mediastinum and pericardium seemed to be filled with blood. After clearing away several ounces of blood from the anterior mediastinum we found an irregular opening in the outer coat of the aorta, situated a little above the origin of that vessel; *no blood* was found in the pericardium, but the two layers of that sac were separated over all the anterior surface of the heart down to the apex, such a quantity of blood being effused as made the anterior wall an inch thick. A layer of coagulated blood extended beneath the outer coat of the aorta to beyond the origin of the left subclavian, forming a channel in which the coagulated blood bathed two thirds of the middle coat on its anterior and inner aspect. Beyond the origin of the innominate artery a transverse slit was found in the inner and middle coat of the aorta three quarters of an inch in length. It was situated on the inferior surface of the transverse portion of the arch. The aorta was dilated and extensively affected with atheroma, the middle

and internal coats were so brittle transversely that the slightest pressure with the finger was sufficient to make an opening. All the valves of the heart were diseased, the walls of the heart being slightly hypertrophied and the ventricles dilated.

Case 2.—In this case the post-mortem appearances were very similar. The blood had extended upwards and downwards for nearly the same distance, and no blood was found in the pericardium, but the case differed in the opening being beyond the origin of the left subclavian, and that nearly all the blood in the man's body had been discharged into the left pleura. The brain, especially, was completely emptied of arterial blood, the sinuses still retaining a very small quantity; the coats of the vessel did not seem so extensively diseased as in case No. 1, but the heart showed more hypertrophy. All the valves were diseased.

Case 3.—In this case the place of rupture was on the right side of the aortic arch, just above the valves; the blood was discharged *into* the pericardium, that sac being completely distended with coagulated blood. The opening in this case differed in shape from the other two; it was irregularly circular, instead of the transverse slit. There was no separation of the outer coat of the aorta above the opening. The heart was hypertrophied and dilated; the mitral valves were especially affected with disease, the aortic much less.

Remarks.—In looking over the literature of the subject we find a goodly number of cases on record. Dr. Peacock, in the fourteenth volume of the 'Transactions of the Pathological Society,' analyses eighty cases. On examining all the books at our command we can collect fifteen more, making the total of ninety-eight.

From these cases we may draw the following conclusions:

1. That dissecting aneurism generally occurs in advanced age, and oftener in men than women.

2. That its onset is mostly sudden, during or after moderate exertion, and that death occurs sometimes instantaneously, nearly always rapidly.

3. That the disease is, except in a very few instances, accompanied by one or more of the following lesions, viz. atheroma and

dilatation of the aorta, valvular disease of the heart, hypertrophy and dilatation of the heart.

4. That rupture occurs most frequently in the thoracic aorta, the frequency being greatest in the first part of the arch.

5. That the sac of the aneurism may be very small, generally extending a few inches along the vessel; in some instances it has reached to the iliac arteries, or even in one instance to the popliteal. In none of the cases does the sac seem to have extended so far into the layer of the pericardium as in Cases 1 and 2.

6. Death occurs most frequently from rupture into the pericardium. It also occurs from rupture into the mediastinum or pleura.

7. That the line of direction of the rupture in the internal and middle coats may be transverse, longitudinal, or oblique; that it varies much in extent, in some cases separating these coats all round. The predominant direction seems to be transverse. Frequently there are several ruptures.

8. That the symptoms consist of a tearing pain in the region of the vessel, an anxious countenance, collapse, &c., but these accompany the rupture of any aneurism, and contain nothing that can assist the diagnosis.

9. That three cases having been found in the practice of the Liverpool Workhouse Hospital, in less than two years, would lead one to suspect that a great many cases of sudden death from so-called "cardiac" disease may have been instances of this lesion, especially as we so frequently find the accompanying lesions in old men, who have died from other causes.

THE DIFFERENTIAL DIAGNOSIS OF UNAVOIDABLE AND ACCIDENTAL HÆMORRHAGE, AND THE TREATMENT OF THE LATTER.

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In a recent communication to the Liverpool Medical Society I considered at length the application of vaginal stethoscopy to the exact diagnosis of the placental implantation, and pointed out its value as a means, not only of distinguishing the existence of placenta prævia *when the os uteri is not sufficiently dilated to permit of digital examination*, but also the differential diagnosis between a centre for centre and a marginal presentation. Now, I am desirous of drawing attention, in the first place, to the application of the same mode of diagnosis differentially, in distinguishing between the so-called *accidental* and *unavoidable* hæmorrhages. The term accidental, introduced by Dr. Rigby of Norwich in his celebrated memoir, is descriptive of the cause of this complication when the placenta is normally placed in the fundus or middle segment of the uterus, a condition justifying the expectation of the natural termination of the parturient condition, but suddenly interrupted accidentally by sudden shock, a fall, a blow, fatigue, violent exertion, or even a fit of laughter, or by such pathological conditions as excessive action of the utero-placental vessels, fatty or calcareous degeneration of the placenta, general plethora, spasm of the uterus at the placental seat, and the natural contractions of the uterus, as described by Braxton Hicks, during the latter months of pregnancy, or in labour, especially when sudden and rapid at too early a period, and in cases of twins and dropsy of the amnion. A good

example of the occurrence of this accident in a twin pregnancy I shall by and by relate to you.

In the first place, let me draw your attention to the differential diagnosis of accidental from other forms of uterine hæmorrhage. I shall follow the usual natural divisions of accidental hæmorrhage into two distinct forms, the external and the internal; the latter not manifesting itself by any external or vaginal discharge of blood, while the former does so. But this discharge of blood per vaginam may be indicative of either the unavoidable or the accidental form of hæmorrhage, and hence it is necessary to determine which of the two it may be with precision and certainty. If it arise in the sixth, seventh, or eighth month of pregnancy, and if we see the case at the very beginning of the attack, before the os uteri is open in the smallest degree possible for the admission of the finger, the only method laid down by systematic writers, and even by the latest, Leishman of Glasgow, is the old distinction laid down by Rigby, that in accidental hæmorrhage the flow stops during uterine contraction, and in the unavoidable it is increased. But in both forms there are frequently no pains, and the distinction, though theoretically true, is vague and uncertain in its application in practice. What then? In head presentations a well-educated *tactus eruditus* may enable the accoucheur to determine the presence of the fœtal head pressing on the wall of the lower segment of the uterus, and by inference the absence of the placenta. This would be sufficient if it were ascertained as a matter of absolute certainty that there was no cotyledon of the placenta verging over the internal os, and if ballottement confirmed the correctness of digital touch. Yet all these forms of diagnosis are liable to error, and their value is a comparative one, dependent upon the skill and acumen of the practitioner. But vaginal stethoscopy enables us to take another step in advance of the usual methods. For a full description of this method of diagnosis I must refer you to my original paper, published in the 'Edinburgh Medical Journal,' November, 1872; and notwithstanding the claims of priority made by Dr. Keiller, and others in Edinburgh on his behalf, the absence of their being able to point to any published statements upon this subject leaves me no alternative

but to lay claim to the practical application of this method of exact physical diagnosis. If there is complete absence of the placental bruit in the vaginal excavation, or rather in the whole of the roof of the pelvic strait, the placenta is not fixed there, and the hæmorrhage is not unavoidable. This view will be confirmed if abdominal stethoscopy determines the situation of placental implantation to be over the middle or fundal zones of the uterus. And here it is well to point out how the two forms of hæmorrhage graduate into each other by certain links of connection, so that at one stage of the gradation it would be well-nigh impossible to decide whether the hæmorrhage arose from so-called accidental or unavoidable causes. This is seen when only a few vascular radicles extend from the placenta, when it is implanted low down in the uterus, across the inner orifice of the os internum. This forms, as it were, the connecting link between the two, and it is well to remember it, for the same treatment is applicable to the partial placental presentation form of hæmorrhage and the accidental.

The second or internal form of accidental hæmorrhage has also been well termed latent so far as the absence of external bleeding is concerned, but the symptoms are generally too well marked and alarming to be so designated. A patient so attacked may have no premonitory symptoms otherwise than an uneasiness in the lower parts of the abdomen, back-ache, perhaps restlessness and an anxious expression of countenance, or there may be an utter absence of all symptoms, and the very first indications of the attack may be sudden giddiness, cold perspiration, and rapid fainting, perhaps attended with a more or less well-marked rigor. If she is seen shortly after, and the hand is placed over the abdomen, the uterus will be found to be hard, and it may be nodulated, from distension, in proportion to the quantity of blood extravasated; and on recovering from faintness this gives rise to a feeling of tension and pain in the womb, accompanied by the abdominal expression of countenance, jactitation—neither being able to rest in bed nor sit up—and vomiting. Digital examination of the os uteri will reveal nothing, and the accoucheur will only be able to arrive at his diagnosis by an appreciation of subjective symptoms

and by abdominal touch, as here stethoscopy will be of no service whatever if the placenta has become completely detached from the middle or fundal zones of the uterus; and even supposing a circumscribed placental bruit could be detected, indicating only partial separation, it would not be of any practical value. Moreover, the restless state of the patient would debar the possibility of careful and correct stethoscopy. The condition is a most dreadful and perilous one for the patient, and I hardly know of such another which throws at once such a weight of responsibility upon the accoucheur; for upon his decision and promptness of action, upon the judicial clearness of his judgment as to the real state of the case, depends whether active interference—speedy delivery—is demanded immediately, and perhaps at terrible risks, or whether prudent delay can be practised, but a delay of such a momentous character that it may be for life or for death. These are questions which I shall now proceed to discuss, and illustrate under the subject of treatment by condensed reports of cases showing the various phases of the accident which I have either met with in my own practice or of which I have availed myself from the practice of others.

In considering this part of my subject let me first glance at the simpler forms of accidental hæmorrhage before passing on to the more severe and dangerous types. Although not classed under this head in systematic works, the most common is that of simple miscarriage or placental apoplexy, where it is of interest to notice that the extravasation of blood begins, not often at the marginal attachment, but towards the centre, and extends towards the circumference, where it may or may not escape by detaching the membranes downwards to the os uteri. These cases are of such frequent occurrence that no difficulty need be experienced in testing the correctness of these views; and they are important, for in the more rare and dangerous forms of the disease towards the latter months, or even at the full term, of pregnancy, the same laws hold good, and placental detachment takes place precisely in the same way, although frequently arising from different pathological causes, such as fatty degeneration, chalky deposit, syphilitic or tubercular disease, in contradistinction to more common causes of early abor-

tion, such as sudden shock, mental or bodily, uterine displacements or uterine fibroids, or disease of the cervix with an absence of placental disease.

With regard to the treatment of this early form of accidental hæmorrhage, there are only two indications which ought to be constantly before the minds of practitioners—first, to prevent loss of blood by plugging, and second, to empty the uterus as soon as it can be done with safety to the patient, that is, whenever the dilatation of the os uteri will permit of it. So treated, miscarriage is a simple matter; but how frequently those engaged in the special practice of diseases of women are consulted by women with blanched pale faces, who have made a bad recovery from the last miscarriage, who, indeed, suffer from disease of the cervix, perhaps of the whole uterus, with broken-down health, the consequences of profuse, prolonged, unchecked flooding, and putrid discharges from the *débris* of the rotting placenta, which ought to have been taken away. A permanently weakened uterus often results, and hence the constant recurrence of the habit of miscarrying at the rate of twice a year for many years, as in an instance which came under my observation lately. The treatment of accidental hæmorrhage is the same up to nearly the sixth month of pregnancy, with only two additional precautions—that the membranes should be ruptured before the use of the tampon, if the latter is at all necessary, which rarely happens, and to keep the uterus contracted upon the fœtus. The following case is a suitable example of this form.

Mrs. A—, who considered herself six months pregnant with her fourth child, was taken in labour with hæmorrhage after overexertion in attending to the business of a grocer's shop, in February, 1869.

She was seen by a medical man about 9 p.m., who did not think the hæmorrhage serious, and he prescribed a draught and left her. At 4 a.m. an urgent message came for the doctor's immediate attendance, as it was thought the woman was dying. He was engaged, and I was asked to visit her. She was blanched, fainting, and tossing about, and the bed was saturated with blood.

The bag of membranes presented. I ruptured them, gave brandy and ergot, and with the hand compressed the uterus and kept it contracted upon the fœtus. After an hour she rallled sufficiently by the help of Gillon's extract, &c., to warrant my completing delivery, which was done without any difficulty, and she made a good recovery. Here after the membranes were ruptured the bleeding ceased. Should it not have done so, the question lay between plugging so as to control the hæmorrhage in one direction, and compression of the uterus in the other to ensure contraction, or immediate delivery, and so running the risk of killing the patient in her prostrate condition by shock in the attempt to save her from bleeding from death. When the uterus is small and well contracted and the prostration great, and the os uteri not dilated nor easily dilatable, and the hæmorrhage goes on, I should plug; but when the organ is large, and the os well opened, and contraction difficult to obtain and retain, and hæmorrhage still continues after rupturing the membranes, and delivery can be easily accomplished, it will be well to do so.

But we may have repeated attacks of accidental hæmorrhage during pregnancy without being forced to hasten or complete delivery from severity of dangerous symptoms. In November, 1870, I showed to the society a placenta from a patient who was delivered at full term after three distinct attacks of accidental hæmorrhage. The case altogether was an interesting one, and I shall shortly relate it.

Mrs. D— became pregnant for the third time in February, 1870. Her previous children were healthy at birth, but one died in convulsions from teething with symptoms of head complication, such as increased vascular distension, squinting, and open fontanelles, and during the last pregnancy she was seized with hæmoptysis and tuberculosis of the left apex. A brother died of acute phthisis pulmonalis after repeated profuse epistaxis. About the third month she had a serious uterine hæmorrhage, but under treatment it subsided and the pregnancy went on. On two subsequent occasions, the last about six weeks before her confinement, she had severe hæmorrhage, which brought on fainting and great

prostration, but which yielded to treatment on both occasions and she rallied in strength. On November, 1870, I found her complaining of intense pain over the left temple, eyebrow, and forehead. The face was swollen, the conjunctiva injected, and pain prevented sleep. On requesting her mother to bring me "pen and ink" she said "pen and ale." Her mother observed she had been misplacing and misapplying her words for the past three or four days, and the patient herself was conscious of it, but could not control her powers of speech, and only recognised the error after it was made. She passed abundance of pale urine of sp. gr. 1007, not albuminous. She was ordered a scruple of the compound jalap powder. On the following day after free purgation the power over speech returned, but two days after the pains in the head returned violently, and the aphasia reappeared in a minor degree. Chloral hydrate was successful in alleviating pain. On November 21st she was delivered without hæmorrhage of a putrid child about full term, and on December 5th, or fourteen days afterwards, she died from pyæmia.

No post-mortem was allowed. The placenta from that case was a remarkable example of the source of the hæmorrhage in such cases, as manifested by three distinct clots of different ages lying in the direction from centre to circumference. In such cases as this, where repeated hæmorrhage and cessation takes place, it is often difficult to decide whether the hæmorrhage comes from the placenta itself, or, as Burns thought, from the utero-decidual vessels. This has been doubted, but in such a case as that which I described in my paper in the 'Edin. Med. Jour.' above referred to, repeated hæmorrhages had taken place, and yet the placenta gave no evidence whatever of the source of the bleeding, and therefore I am inclined to agree with Burns as to its origin in such cases.

Now I shall proceed to the next degree of danger connected with accidental hæmorrhage, namely, profuse flow at or near the full term of gestation. I shall not enter into the minute details of causation, as this is more of a practical than a pathological paper, and, keeping this object in view, I cannot do better than bring under notice a case described in the reports of the Edin. Obstet.

Society by that excellent and experienced practical accoucheur Dr. Burn, of which the following is an abridged report:

A woman came to him one evening saying she would require his services by and by, and she complained of a peculiar sensation which came on during the day, as if baby had fallen down. There was no discharge or urgent symptoms then present, and he promised to see her next day. At 4 a.m. he was called to her by the husband, who said she was apparently in a dying state. He found her very weak, and the bed swimming with blood. After giving stimulants and finding the os uteri pretty well dilated, and no portion of the placenta within reach, he turned and delivered the child speedily, but the patient died in about half an hour.

The following case, almost precisely similar in character to Dr. Burn's, occurred last July in my practice. At 2 a.m. I was called to see Mrs. H—, who was said to be very ill. I found her fainting in bed, lips and face blanched, a chamber-vessel three parts full of blood coagulum, blood in a washhand-basin, the bed saturated, and the flow still going on from the vulva. She was at the full term of the ninth pregnancy, and to show the hæmorrhagic tendency I mention that on five different occasions, under the care of able accoucheurs, she had post-partum hæmorrhage of such a dangerous character as to put her life in jeopardy, and on three subsequent deliveries under my care, by the use of ergot before delivery and the proper management of the placenta afterwards, no hæmorrhage whatever occurred. She had never been attacked with accidental hæmorrhage during any of her pregnancies until now. The os uteri was the size of a florin and dilatable, and the membranes intact. I ruptured them at once, gave brandy and ergot in large doses, compressed the uterus, and sent for Aveling's transfusion apparatus. She rallied for a time and the bleeding seemed to cease (externally it did), but it returned and fainting again came on in a modified form. Matters now had become desperate, and it became necessary as a last resource to empty the uterus. I turned bimanually, brought away the dead child, and contracted the uterus thoroughly, expelling placenta and a large mass of clots, but

still bleeding in a small continuous stream went on, until checked by the perchloride of iron. She died before transfusion could be done, about half an hour after delivery. This I much regretted, as I had her own blood ready to inject into her vein, but the apparatus arrived a few minutes too late. My friends Dr. Baker and Dr. D. H. Bruce saw this case, and agreed with me concerning the treatment I had carried out.

The next belongs to the same class of cases. In November, 1865, I was called five miles into the country to see a poor woman who had been flooding in labour all night. She was tossing about in bed, and blood running over the cottage floor. The cause she stated to be over-exertion in carrying bricks, the basket being sustained by the womb in the last month of gestation. She had lost blood for thirteen hours. I gave stimulants freely, and she rallied somewhat, but the hæmorrhage continued; I therefore ruptured the membranes, and turned without the least effort. The uterus contracted, and placenta and about a quart of clots came away easily under manual pressure, but she only lived about forty minutes, though there was no post-partum hæmorrhage.

In these three cases—faithfully reported, however painful it is to relate unfortunate results of practice—it was evident, both to Dr. Burn and myself, that to have waited would have been to stand by and see the patients die, and yet, in the attempt to save them, they all died about the same time after delivery. In the last case nearly all the patient's blood had drained away during the long period of thirteen hours, so that there cannot be a doubt that if she had been seen early her life would have been saved. In the first case I relate, so sudden and profuse had been the first discharge that the patient never rallied, and rupturing the membranes and waiting was of no avail. Indeed, the only thing possibly of service would have been transfusion immediately after emptying the uterus. The position of the accoucheur in such cases is a most difficult one, and we cannot sufficiently know and ponder over all the varieties of situation we may be placed in, and have our minds made up as to what we should do and what we should not do in the various conditions in which we may suddenly find ourselves, when

there is hardly time to permit us sending for counsel or more experienced help. After prolonged consideration of these cases it seems to me that the correct practice is, first, to rupture the membranes; second, to compress the uterus; and third, to give stimulants and ergot, and wait and watch whether the hæmorrhage stops or not. If it does the patient gets time to rally, and the labour may be left to nature, or terminated by art, as the circumstances of each individual case may demand. But the hope of the hæmorrhage ceasing is in most instances a forlorn one, and the dreadful alternative arises of delivery or non-delivery, and with this fact before one's eyes, that under such conditions patients die undelivered as much bled to death as if they died after judicious artificial delivery. In the latter instance we are apt to say, Had we waited a little longer would it not have been otherwise? and in the former, Had we delivered our patient would not the bleeding have ceased, and her life have been saved? I think to deliver is the correct practice.

In the above cases we had external evidence of hæmorrhage before the completion of the first stage of labour, but it may also come on at any stage of labour; and this is a most important division of the subject, because it is necessary to be able to differentiate between the diagnosis of accidental hæmorrhage, rupture of the uterus, and laceration of the umbilical cord. The latter will only affect the child, and I have only seen it once happen, and then I detected it by the succeeding waves of blood of an arterial character. Powerful labour and a short cord explained the accident, but immediate delivery saved the child. So rare is rupture of the funis that the mere mention of it will suffice. Fortunately the diagnostic symptoms between accidental hæmorrhage and rupture of the uterus are pretty well marked, and the same treatment is applicable to both, namely, speedy delivery and subsequent contraction of the uterus. In the former the labour pains are generally ineffective and of short duration; in the latter, powerful and of long duration until the moment of rupture, when they suddenly cease, and the head retracts, while in the former it never does. The subsequent collapse is common to both, but in the one it occurs suddenly and immediately after the hæmorrhage, while in the other it generally—but not always, for the hæmorrhage may

be hidden—comes on after considerable external loss of blood. The following case shows the good effects of rupturing the membranes in these cases as a means of checking hæmorrhage.

On February 17th, 1866, I was called to Mrs. H— in her seventh labour. For six weeks she had been suffering from false pains, which she attributed to a fright. The os was dilated to the size of a crown piece and dilatable, but the membranes were entire and not protruding. Pains left her, and on February 27th she thought the waters broke, but she had no pain other than what she had been experiencing for the past seven weeks. On examination I found her flooding and the membranes entire, the os uteri as before, and no portion of placenta within reach of the finger. I ruptured the membranes, and the head, which had already engaged the brim, was soon forced down by a powerful pain, and the first stage of labour was immediately completed, and all hæmorrhage ceased. An hour and a half after, the labour terminated naturally, without any symptoms of further loss of blood. The umbilical cord was coiled twice round the neck of the child, which was well grown, but dead. A succession of gushes of blood followed in alarming quantity, so I immediately emptied the uterus bimanually. A large fibrous clot, of a dark colour, was firmly attached to the placenta, and several pieces nearly as large followed. She recovered.

This is one of those cases that stand at the end of the first, and, as it were, at the beginning of the second stage of labour, so that whenever the membranes are ruptured the second stage is speedily entered upon by one or more uterine contractions, and, as in this instance, the hæmorrhage frequently ceases. But suppose it had not ceased, what would have been the indication? Clearly to put on forceps at once, and by delivering secure what is in truth nature's hæmostatic, namely, contraction of the uterus. But forceps may not always be at hand. The late Sir James Simpson, I recollect, in his lectures, always advised his pupils never to carry forceps with them, as they might be tempted to use them unnecessarily; but now I doubt whether this teaching is correct. What, then, are we to do? First compress the uterus with the hands,

and by abdominal compression hasten or complete the labour, at the same time administering a full dose of ergot; or hasten delivery by another method, as in the following case. Mrs. M— wanted my attendance, and I went at once. Her previous labours had been quick and favorable. On entering the lying-in room I felt alarmed at the blanched appearance of the patient, and her mamma and the nurse were giving brandy for faintness. Pains were not effective, so, after giving ergot and brandy, by abdominal compression and a finger in the rectum I completed the labour rapidly. The bed was saturated with blood; the child was dead, as it nearly always is in these cases, and a large recent coagulum accompanied the placenta. She was much reduced, and has taken nearly three years to recover her former state of health.

Now I would draw your attention to a case related in the 'British Medical Journal,' January 3rd, 1874, which occurred in the practice of very excellent London accoucheurs, and I make the quotation because it illustrates a method of treatment sometimes followed, but which I cannot agree with.

"The wife of a naval surgeon, of strong, wiry constitution, who had passed through several pregnancies without accident, when within a fortnight of the natural term was seized with severe accidental hæmorrhage whilst going up stairs, and without any previous pain. No trace of the placenta could be felt within the circle of the orifice as far as the finger could reach. I at once passed an elastic bag, and distended it with air so as to completely fill the vagina.* The face at this time was pale, the pulse of fair strength, the voice good, and there were no indications of collapse. After about three hours, during which there was no bleeding(?),† I again examined the patient, and found the orifice slightly larger." Her husband being at this time accidentally absent, the author sent for another accoucheur, who arrived in due time, and "after a short delay applied the forceps and delivered her of a dead child. There was no pain either before or directly after delivery. 'The consultant' at once introduced the hand into the uterus in

* This, of course, would act as a plug.

† Externally, the author must mean.

the absence of a pain, and immediately extracted the placenta, with a considerable amount of coagulum. The uterus contracted firmly. No pain was induced by the extraction of the placenta. nor was there any hæmorrhage; but taking into account the exhausted state of the patient, and the probability that a further small amount of hæmorrhage might prove fatal, it was decided that the uterine cavity should be injected with a solution of the perchloride of iron. Some solid perchloride was mixed with water, and no sooner was the iron injected than the patient began to complain of severe pain in the hypogastrium. It was agreed to administer opium as required. This was done in three doses of nepenthe of twenty minims each, or one fluid drachm in all, but without in the slightest degree alleviating the pain; in fact, it rather increased in severity, and she died exhausted in about seven hours. I saw her about ten minutes before her death, when the pulse was very weak; but the patient was quite conscious, and able to speak about her husband and other matters. No post-mortem examination was made."

In reviewing this, but in a controversial spirit, another metropolitan accoucheur remarks, "I know not what feeling this case may produce with practical accoucheurs generally, but with me it causes a feeling of painful astonishment. To introduce the forceps in a case of accidental hæmorrhage, when bleeding has ceased and no pain was present to indicate any tendency to contraction, and to extract the child, appears unaccountable. To immediately introduce the hand in the absence of a pain and remove the placenta, without taking any previous means to ensure contraction, is only marvellous it was not followed by serious hæmorrhage. . . . . And again to introduce the hand in the absence of any hæmorrhage and in the absence of any pain, and to throw into the uterine cavity a solution of perchloride of iron, probably of considerable strength, was so extraordinary a proceeding that I hesitate to characterise it by words," &c. It is easy to judge after the act, although I feel certain that none of these accoucheurs will object to fair criticism, and especially if we put it in this form, in which we are chiefly concerned, namely, Suppose any of us had been called to such a case—and we never

can tell when we may be placed precisely in the same position—*what would we have done?* For my own part, guided by principles I have already pointed to in this paper, I clearly see what would be the course to pursue. In the first place the os was dilated and the bleeding comparatively slight, and there was no shock to the system. Rest and opium in full doses to calm the circulation might have proved sufficient until the os became more dilated or dilatable, taking care to wait and watch; but should these means have failed and external bleeding continued, or if the constitutional symptoms of hidden or internal hæmorrhage into the uterus manifested themselves, the next step would have been to rupture the membranes and secure contraction of the uterus by full doses of ergot and manual compression. After rupturing the membranes, if no hæmorrhage continued, then it would be proper to wait until the os became dilatable, and, if nature was not sufficient, to carefully help the delivery. Bimanual extraction of the placenta and contraction of the uterus would be all probably afterwards required, but to introduce the hand *in utero* in such cases, where there is not likely to be adherent, but rather separated placenta, is bad practice, as it intensifies the already existing shock, and under the conditions mentioned to have injected the perchloride of iron was assuredly to bring it into disrepute. To plug, even by an elastic bag, as was done, is certainly most dangerous practice, and can only convert external bleeding into concealed or internal hæmorrhage, perhaps the most fatal form of this class of accident to the pregnant woman, which I shall now proceed to show by a careful review of cases, as I consider it the most difficult and most important of the divisions of accidental hæmorrhage.

The following case of hidden or internal accidental hæmorrhage occurred in the practice of Dr. Wigglesworth, of this town, who kindly placed its history at my disposal. He states, "I was accidentally called to the patient about 1 p.m. I found her in a state of collapse, shrunken face, rapid pulse, cold extremities, and suffering great pain in the left side; seven months advanced in pregnancy. History was that she had been greatly exerting herself in moving, but on the morning of that day

had done nothing particular. There were no symptoms that could possibly refer to any other organ but the uterus. An examination internally failed to throw any light upon the matter. A second visit in about an hour and a half found no change, with the exception of a great increase of pain, and all movements of the child had ceased. With considerable difficulty I pushed my finger through the os and ruptured the membranes. I tried manually to dilate the os, but only slightly succeeded. In about two hours or more I tried again, but only succeeded as far as to admit two fingers, and found a natural presentation. The patient ultimately died in about five hours from the commencement. A post-mortem showed the uterine cavity perfectly free from blood, but upon looking at the placenta and endeavouring to remove it I found, after I had separated about three quarters of an inch of the border, that it was completely detached from the uterus with the exception of a ring of adherent placenta all round. There was a firm clot occupying the detached space, but not more than would weigh about one pound."

This case of placental apoplexy, or hidden accidental hæmorrhage, is similar to nearly all cases of abortion in the early months in this respect—that placental separation and bleeding takes place from the centre to the circumference. What at once takes the attention is this, how could such a comparatively small bleeding account for death? We can hardly give shock the whole blame, for it generally kills suddenly. It is, perhaps, rather to be explained in one of two ways—that a pound weight of compressed blood-clot at the end of say twenty-four hours would represent a very considerable quantity of blood; or that the patient was a weakly woman, to whom the loss of a pint of blood was fatal.

Dr. Desmond, one of our most experienced accoucheurs, relates a case almost precisely similar* of a lady in delicate health who died in the same way, and in whom the os uteri could likewise not be dilated and delivery hastened. Transfusion failed. The next

* *Vide* 'Liverpool Med.-Chir. Journal,' vol. i, p. 81. Dr. Desmond gives a *résumé* of fatal cases in the practice of Johnson and Hardy, of Dublin, Lee, Oldham, Churchill, &c., and states his opinion that these cases are all but hopeless from the beginning. They are fortunately of rare occurrence, and, to use the words of Dr. Blundell, "scarcely admit of a remedy."

case is a very typical one. I quote from an excellent paper on the subject in the 'Edin. Obstet. Transac.,' vol. i, p. 51, by Dr. Cappie, of Edinburgh. He relates two cases, both followed by recovery, but time only permits me to bring one before you. "Mrs. C— was a healthy woman, whose previous labours and recoveries had been good. Six weeks before her expected time, in the forenoon she felt her back weak and had some abdominal pain, which she supposed was caused by flatulence. About midday, as she was standing attending to some household duties, she suddenly became giddy, and clutched a chair to support herself. Cold perspiration and fainting followed. She was put to bed, and on attempting to rise she was seized with a shaking, aguish feeling, and again she fainted. On becoming conscious she felt the abdomen had become greatly more distended than it had been. She felt very uncomfortable from tension and pain in the uterus, began to toss about, could rest neither in bed nor out of it, and she vomited repeatedly. When I saw her her countenance had that painful expression of anxiety and prostration which makes me at once suspect some serious mischief. The crampish spasmodic pain was constant and distressing, and a fidgety, sick, restless feeling prevented her from keeping in one position beyond a few seconds. On examination I found the os uteri completely closed; there was no evidence of labour having commenced. On placing the hand over the abdomen its enlargement and the hard scirrhoid feeling of the uterus were very striking, but there did not appear to be any regular contractions of the uterus. I waited some time and ascertained there was no increase in the swelling. One hour and a half afterwards, as the restlessness continued and some interference appeared absolutely necessary, I made efforts to dilate the os uteri." He succeeded in doing this and ruptured the membranes; expulsive pains followed, and about an hour and a half after forcing the fingers within the os he was able to terminate the labour. The child was dead, and the placenta came away with about a chamber-pot full of clots. She made a slow but good recovery, being able in three weeks to sit up in bed. The placenta was healthy, but had a tear in its centre, and no clots were found in its substance.

This is a case well told, boldly and successfully treated, and the second in succession, the first being more hopeless than it, but which I passed over because I consider this the more typical case, occurring in a healthy woman. It needs no remarks, for every stage in the history of its development and treatment is so well and graphically described that I would recommend every medical man practising midwifery to study it well.

And now I shall relate the leading facts of the case of twin pregnancy previously referred to, complicated with accidental hæmorrhage. It is headed in my case book "Accidental hæmorrhage; separation of half of placenta and death of first twin; profuse hæmorrhage, post-partum with referencc to first child, but ante-partum to second child; artificial delivery of second child, living; oozing from cervix; tendency to death obviated—1st, alum sponge; 2nd, injection of perchloride of iron; 3rd, transfusion. Recovery."

Mrs. C— was taken in labour with her eighth cqnfinement at full term, June 4th, 1871, at 6 a.m. At 11.30 a.m. I was sent for, and on entering the room was at once struck with her unusual pallor. She complained of constant intense pain over the lower segments of the uterus, and she had vomited three mouthfuls of blood. The os uteri was dilated to the size of half a crown, somewhat firm and rigid; lips thick, but dilatable on pressure, and the membranes were very tense from distension. The abdomen was large and irregular, fœtal heart distinctly audible, but covered by placental bruit over the umbilical region, and not towards either groin. As she was evidently suffering from over-amniotic distension and fruitless pains, and as her expression of countenance hinted at the possibility of hidden hæmorrhage, an idea which was somewhat confirmed by a pretty rapid weak pulse, I ruptured the membranes and discovered a breech presenting. A large gush of sanguineous amniotic fluid came away. I waited and watched, and in an hour and a half the dilatation was sufficient to permit the breech to be forced down into the pelvic cavity, but then a profuse hæmorrhage began to succeed each pain. I therefore hooked a finger round the thigh and brought down the child,

livid and dead. It was, therefore, evident there was another living child, and examination confirmed this. I gave ergot and waited for a pain, and with it came a profuse gush of blood, which led me to rupture the second bag of membranes at once. A shoulder presented, which I tilted up in the attempt at bimanual turning, but the head came into contact with my fingers, and finding it to be small, while I knew the pelvis was of the major kind, large and roomy, I grasped it with my hand, and by the help of abdominal compression delivered her without any difficulty speedily of a living child. The placenta came away by the continued compression of the uterus, accompanied by a large mass of recent and old clots, one of the latter being as large as a fœtal head, solid in consistence and black. The uterus remained contracted and the obstetric binder was carefully applied, for if of any use at all it must be after excessive abdominal distension, and she seemed to do well, but in half an hour she became restless, and although the uterus was contracted, a small trickling stream of blood was flowing constantly from the vagina. A teaspoonful of laudanum in a wineglassful of brandy was given immediately, cold applied externally and to the cervix, and then an alum sponge was placed in contact with the everted, irregular, and perhaps minutely lacerated cervix uteri, although no tear could be felt, while I kept the uterus pressed down upon it with the other hand. Still she became more restless, pale and cold, and asked why the kettle was singing. I gave another dose of laudanum, and brandy was continued at intervals. With a Higginson's syringe I kept up a constant cold douche upon the cervix uteri for about five minutes, but again the small blood stream reappeared. Then I injected the perchloride of iron, one part of the Liq. Ferri Perchlorid. fort. to four parts of water. This alarmed me by the great pain it gave rise to in the vagina and womb, from which it extended to the whole pelvis, back, and abdomen, accompanied with short respiration and a facial expression of intense anxiety. The pain was so intensely alarming that I feared the shock would kill her, so I gave thirty drops of laudanum, and continued the brandy until a bottleful was administered. Still the jactitation, &c., continued, and I began to foresee that transfusion was my only hope, and I

made my arrangements to do so without delay. I asked my colleague at the Lying-in Hospital, Dr. Grimsdale, to see the patient, and sent for Mr. Higginson, who has made transfusion a special study, and a consultation was held between Drs. Higginson, Grimsdale, Hugh Miller (then my assistant), and myself. She was then suffering from great uneasiness, jactitation, coldness, and pallor, the pulse being 134, irregular, very weak, and sometimes imperceptible, but there was now no hæmorrhage. Mr. Higginson proposed to delay operating for one hour, and by the majority it was almost agreed to do so, when, still doubtful of the propriety of waiting, and remembering that for transfusion being successful it ought to be done as early as it is seen there is absolute need for it, I requested them to remain until I had again visited the patient. She was then pulseless, cold, and in great distress, with occasional delirium beginning actively to show itself. I therefore at once assumed all responsibility and requested Mr. Higginson to prepare to transfuse, which was immediately done with our assistance. A maid servant from a neighbouring house supplied the blood, and about six or seven ounces were thrown in before the apparatus, Mr. Higginson's own, became clogged. She became calm immediately after, the pulse fell to 110, and quiet sleep succeeded. Dr. Miller remained two hours with her. The operation was done five hours after delivery. At 10 p.m. the pulse was 108, she took beef tea, felt inclined to sleep, and had no delirium. The following day she told me she remembered nothing of yesterday from about one hour after the confinement. She made a good recovery.

In this case the bulk of the blood was lost before the membranes were ruptured, and it will be seen that a uterus doubly distended, and with an excessive quantity of amniotic fluid, was no protection against hidden hæmorrhage. Now, let us suppose that after rupturing the membranes profuse hæmorrhage had followed externally, can it possibly be imagined that plugging, and so converting external into an internal or hidden or latent hæmorrhage, would be one iota of service? For my part I cannot conceive any more dreadful error, and yet I have seen it frequently done, and there are many accoucheurs who, in blind or thoughtless ignorance, still follow

this practice, which cannot be sufficiently reprobated and denounced. The placenta was common to both children and was very large, but that portion to which the funis of the dead child was attached presented the appearance of having been separated for some time, and presented a marked contrast to the other portion, which had only been recently separated from the uterus.

But accidental hæmorrhage may be hidden in the second stage of labour as well as in the first, or before labour comes on at all, and then we have not the uterine physical signs to aid us in our diagnosis. The following is a good example of that complication, requiring keen perception and acute diagnostic power to detect it at once and apply the proper treatment. I attended the case with Dr. Bellis, of Woolton, the fact that both she and her husband had been forewarned of the possibility of serious complications in labour being the reason I was engaged to be present as consultant. Her history was as follows. She was the mother of six children, all of whom at birth were large in size, and, as a consequence, in some unfortunate manner the perinæum had been so ruptured that Baker Brown was consulted, and he restored it successfully. She became pregnant twice afterwards, but miscarried. Being pregnant again at Clifton, she had flooding, and was confined to bed for two months. On her return journey to Woolton she was again seized with hæmorrhage, and had to break her journey at Worcester, where she remained under treatment for three months. After quickening she returned home, and, by advice, kept the recumbent posture for the remainder of the period of gestation. She was rather despondent, and had to be kept up with extra diet and a sufficient allowance of stimulants. I saw her about the seventh month of pregnancy, and not again until she was taken in labour, on September 1st, 1873. I then discovered that she had had a return of the hæmorrhage ten days before, but in small quantity. Dr. Bellis told me she had made fair progress since his arrival three hours ago. The presentation was in the first position, and the os uteri dilated to the size of a half-crown and dilatable, the membranes ruptured, and uterine contractions occurring every ten minutes, but rather weak and inefficient in character. The pulse was good and the fœtal heart distinct and normal. After waiting

an hour and a half the pulse began to become weak somewhat, and she looked pale and exhausted, although quiet and free from all excitement, &c., and she did not appear anxious after being reassured of the normal state of the labour; and in this we were much aided by the judicious use of chloroform, so as just to keep her hovering on the borderland of consciousness and unconsciousness, according to the recurrence or absence of pain. At the end of that time, no advance taking place and symptoms of depression having just become to be more pronounced, I asked Dr. Bellis to give a full dose of ergot and put her well under chloroform, and I applied short forceps and delivered her of a pretty large living male child. But immediately on the head reaching the outlet a gush of blood rushed over it. Dr. Bellis skilfully compressed the uterus, and I speedily completed the delivery, which was followed by a gush of clots and blood and liquor amnii to the quantity of a chamber-pot full, the clots alone measuring a quart. We repeated the ergot, compressed the uterus and kept it contracted, and allowed the placenta, which was partly in the vagina, to remain for fully half an hour. She came well out of the chloroform immediately after the passage of the head, but looked blanched; pulse weak, rapid, and jerking, with sighing and slight jactitation, but a dose or two of brandy relieved these symptoms. The uterus threatened again and again to relax, and had to be kept contracted by occasional manual irritation through the abdominal wall. It was two hours before I considered it prudent to leave her, and Dr. Bellis remained another hour. She recovered rapidly.

On examining the clots they were found to be of different ages, marking the periods of the occurrence of each hæmorrhagic attack, but the great mass was recent, and a part gave evidence of the bleeding which occurred ten days previously. The very old clots were like wash-leather. The uterus was nodulated, and irregular in contour, from small fibroids.

Little requires to be said in the way of commentary on this case, more than this, that it must be very evident that, if forceps and speedy delivery had not been resorted to when symptoms of collapse set in, with the administration of ergot, neither mother nor child could possibly have gone safely through the labour. To

have a living child under the circumstances was a success evidencing speedy diagnosis followed by prompt and decisive action.

In conclusion, let me reproduce the rules of treatment of accidental hæmorrhage laid down and taught by Simpson.

1. Whenever it is very severe, and the danger great, dilate* the os uteri, and deliver if the state of the parts at all allow it. In very bad cases incision of the os may be required for immediate turning.

2. If the hæmorrhage be more slight, or the os uteri and passages rigid, rupture the membranes.

* Manual dilatation of the os uteri at or after the seventh month of pregnancy I can vouch, from a very considerable experience, to be an operation not difficult to perform if the accoucheur has a small hand. And, so far as I know, it is perfectly safe for the patient. In cases of puerperal eclampsia I have been able to open up the os when there was no dilatation whatever, by introducing one finger and dilating, then two, three, and so on, until the conoid hand passed in utero, in less than half an hour, and we know that nature does the same in less time. When there is hæmorrhage the os uteri dilates easily and speedily under moderate pressure.

NOTES ON SYPHILIS.

By S. MESSENGER BRADLEY, F.R.C.S.

Syphilitic affections of cartilage.—The extra-vascular character of cartilage renders it less prone to inflammatory affections than the contiguous bone, but when attacked its low vitality renders it obstinate to treatment. This is the case in syphilitic affections, whether they be of a secondary or of a tertiary character, as in other diseases of inflammatory origin. Indeed, restricting the use of the term tertiary, as I do, to cases characterised by the presence, in a circumscribed or a diffused form, of a gummatous exudation, I do not know any syphilitic lesions which so steadily resist treatment as the tertiary affections of cartilage. Example is better than precept, and as during the last year I have met with two typical cases of tertiary syphilis affecting the nasal cartilages, I will illustrate my remarks by relating the salient points of one of them, which the other, in almost every particular, closely resembled.

I first saw M. K— in January, 1874, as an out-patient at the Manchester Royal Infirmary. He was a spare man, forty years old, who ten years before had contracted syphilis, for which he had been treated non-mercurially. The secondary symptoms which ensued were of an ordinary and not very grave nature; but after an interval of apparent cure, which lasted over four years, he began, about the middle of 1873, to notice a gradual and painless enlargement of the cartilaginous part of his nose, which very slowly increased up to the time when I first saw him. On examination I found that the bones of the nose were quite unaffected, but that the cartilages were all much thickened by the exudation into them of a diffused gummatous substance. The nose was dusky red in colour, except at the tip, which was quite black and dry, the

black colour being marked off from the neighbouring red by a distinct line. This man remained under treatment for several months, during which time various remedies were tried, *e.g.*, among others the gums were kept tender for six weeks by mercurial inunction. Iodide of potassium was administered in doses varying from five to twenty grains, and after a time iodide of sodium in rather larger doses. Cod's liver oil, sarsaparilla, &c., were also freely given to keep up the tone of his general health, and a variety of local applications, most of them of a stimulating character, were employed. At the suggestion of my colleagues who saw him at a general consultation he was put upon a course of arsenic for some time, but this, like every other plan, failed to produce any effect upon the disease. It is true the disease did not extend, but nothing caused the slightest improvement in the condition of his nose; indeed, there was no apparent change in the organ between his first and his last visit, even the tip remaining as when I first saw it, black and polished, without any sloughing or separation having taken place, or on the other hand any evidence of increased vitality. It was otherwise in the second case to which I have alluded. In this instance the man, who was a weak strumous subject, with the syphilitic cachexia very strongly marked, suffered eventually from phagædena of the nose and necrosis of the hard palate. The ulceration extended into some of the palatal arteries, and violent and repeated hæmorrhages ensued, which were difficult to arrest, and which reduced the poor fellow to a sad state of anæmia, from which neither iron or nourishment succeeded in rousing him. I lost sight of him at last, owing to the fact that he could no longer crawl up to the Infirmary, and have since learnt that he died from exhaustion, following upon an unusually severe attack of hæmorrhage.

Case of syphilitic tetanus.—The following case occurred in the practice of Mr. W. C. Matthews, of Manchester, to whom I am indebted for particulars of the case. Jane C—, married, æt. 35, contracted syphilis from her husband in the spring of 1874, for which she was attended by Dr. John Watson, of this town, who prescribed mercurial pills and black wash. In June she had a

general eruption of syphilitic maculæ, followed by ulceration of the soft palate. On June 26th she was suddenly seized with spasm of the muscles of the trunk, chiefly, however, affecting the dorsal group, and Mr. Matthews, on arriving, found her suffering from distinct tetanic convulsions, the spasms at times producing a slight opisthotonos. He found a ragged and extending ulcer of an unmistakably syphilitic character on each tonsil, and also ascertained that the basal hardness of the initial lesion had not quite disappeared. He prescribed scruple doses of chloral hydrate with a similar quantity of bromide of potassium, which procured her some sleep during the night of the 26th. She awoke, however, from time to time with a recurrence of the spasms, which lasted on an average about a quarter of an hour, and which were as severe as the spasms of ordinary traumatic tetanus. Mr. Matthews cauterized the throat the following day, and ordered the remedies to be continued. The spasms continued during this day and the following night, but with slightly decreasing violence, and with intervals of greater length. He found that *pari passu* with this change the throat improved, and the next day, the 28th, the ulcers had assumed a healthy character. The improvement continued throughout the 29th, both in the condition of the throat and in the lessening amount of tetanus, and after this date there was no recurrence of the convulsions, the case going on steadily to apparent recovery.

It may be argued that the tetanus in this case depended upon the syphilitic poison in the blood, as epilepsy is sometimes caused by syphilis, and not upon the peripheral irritation of the throat ulcers. I do not, however, think this probable, as even in cases of syphilitic epilepsy there is a definite deposit (gummatous) either upon the membranes, or into the nervous pulp itself, of brain or spinal cord, in addition to the virus floating in the blood, and in this instance the poison was no less in quantity after the tetanus than it was before, as no anti-syphilitic treatment was adopted, but the convulsions were observed to decrease with the improvement and to disappear with the cure of the ulcerated throat, which was effected by purely local means. At the same time, while I regard the peripheral mischief as the direct cause of the tetanus,

I do not doubt that the irritability of the nervous system generally, which is so often caused by the presence of the syphilitic virus in the blood, was a predisposing cause, without which it is probable the ulceration alone would not have been sufficient to produce the tetanus.

Periodicity of syphilis.—I think that further observation will show that secondary syphilitic affections exhibit a marked tendency to periodicity in their appearance. The conclusion at least to which I have come is that as long as the dyscrasia lasts it tends to accumulate and break out at certain definite and regular intervals, and further that the seasons of the year exercise a marked influence over their eruption, the early spring being the time of all others when they are most likely to occur. Some cases that I have had opportunities of watching for a series of years exhibit this tendency in a marked degree, though anticipatory treatment seems in some instances to have succeeded in warding off an attack. By way of illustration I may mention the case of a gentleman who for the last six years has had an attack of syphilitic palmar psoriasis every spring from which he is entirely, or almost entirely, free for the remainder of the year. On one occasion only, when he was spending the spring at Spa, did he escape a syphilitic visitation at this season of the year. This afforded me a hint which I have acted on with advantage, viz., of urging patients suffering from long-continued constitutional syphilis to take their sea trips or pay their visits to the German watering places in the spring time of the year in preference to the summer or autumn, which is more commonly the custom.

Congenital syphilis suddenly becoming active in a youth of 17.—J. W—, æt. 17, presented himself in my out-patient room at the Manchester Infirmary for the cure of a painful fissure of the tongue and a sore throat. He was a pale youth, presenting many of the marks of congenital syphilis in a marked degree; the right upper incisor was inclined towards its fellow, and deeply but singly cleft at its free edge; the nasal bones were flattened; the eyes wide apart, and both corneæ somewhat opaque from old keratitis.

His tongue presented the traces of old fissures, but in the centre there was a linear deep crack which gave the most acute pain, and which had appeared within a week. In reference to this he mentioned a circumstance which I have been led to regard as eminently characteristic of all syphilitic affections, viz., the suddenness of its appearance; he said, referring to these rhagades, that he was all right one minute and the next, without anything to account for it, had a sore crack in his tongue. I have known the same thing occur over and over again in syphilitic affections of the mucous membrane of the throat, and remember one case where perforation occurred in the course of two hours in a palate which was previously apparently quite healthy; but to return to the present case. In addition to the fissured tongue the lad had deep, sharply cut, grey-coated ulcers on both tonsils, which were inflamed and painful. I carefully examined his generative organs, but could not find any trace of old or recent scars, neither was there any adenopathy or lymphatic enlargement in the groin or neck. Indeed, I have no hesitation in regarding the case as one of congenital syphilis in which the poison, wonderfully little modified by the lapse of time, or by the double channel through which it had flowed, had burst into activity during the changes incident to puberty, when the system is prone to develope any hereditary taint which may be lingering in the blood. Suffice it to say that the treatment adopted in no way differed from that employed in similar cases of acquired syphilis—mercurial inunction, with the internal administration of the iodides of iron and potassium, cod's-liver oil, &c., and that it proceeded steadily to recovery.

Extensive syphilitic (lupoid) ulceration of the lower lip.—This case illustrates three points in syphilography: 1, the rapidity of the syphilitic ulceration; 2, the rapidity of cure when proper remedies are applied; 3, the instability of the syphilitic cicatrix.

M. O'C—, æt. 30, became an out-patient at the Infirmary in May, 1874, having for two years previously been under treatment at the Homœopathic Dispensary without deriving any benefit. The whole of the lower lip was cut through and eaten away by syphilitic ulceration, except at the angles of the mouth, where the

undercut lip hung over the lower jaw in two angry-looking blood-red flaps. Not only the lip but the greater part of the muscles moving it had disappeared, the depressor labii inferioris, levator menti, and depressor anguli oris had quite gone and left no trace, their place being occupied by a foul ulcer, with sharp and circularly cut margins. Lotio nigra was ordered as a local application; and ten grains of pot. iod. were administered three times a day, with a grain of proto-iodide of the mercury night and morning. In two days the ulcer showed plain evidence of response to the treatment, and was clearly beginning to heal. The cure went on rapidly, and in a fortnight all that was left of the ulcer was a small central hole below the incisor teeth, through which saliva constantly trickled. The resulting cicatrix was firmly adherent to the lower jaw, and although the two separated edges of the lips were brought by the contracting cicatrix very near together they never came into actual contact. She remained in this condition for about two months, that is, with the ulcer almost healed, but still with a little round hole the size of a small pea which would not close. While I was meditating the propriety of some plastic operation she one day came, about three months after her first appearance, complaining of violent pain in the cicatrix, which she said she was sure was about to break down; of this, however, I could find no evidence, so told her to continue the treatment and come the day but one following. She came as requested, and then demonstrated the value of her subjective symptoms, for the ulcer had again broken out into activity and was rapidly assuming its original proportions. The pain was so intense as to necessitate large doses of opium, and everything was done to stay the plague, but for a time in vain; indeed, it was not until she was again brought slightly under the influence of mercury that the sore showed any signs of being arrested in its destructive march. The only local application that appeared to be of service, and certainly the only one which suited the feelings of the patient, was a mixture of iodoform and glycerine (iodoform ʒj to glycerine ʒiv). I may incidentally mention that I have extensively used iodoform in cases of syphilitic ulceration, and I find it generally grateful to the patient, though I do not consider that it possesses, as a rule, any marked superiority over

many other applications, such as alum, chloralum, &c., and that as an all-rounder it is decidedly inferior to solutions of nitrate of silver.*

Syphilitic fissures of the tongue, ending in carcinoma.—I relate the following case in the belief that it tends to establish the possible evolution of carcinoma from syphilis.

I first saw R. J— in January, 1873, when he was suffering from syphilitic sore throat and syphilitic rhagades of the tongue. He was a weakly man, of dissipated habits, and his mother had died of mammary cancer. He did not attend the hospital very regularly, but I saw him sufficiently often to trace the effect of treatment, which was satisfactory. The throat and the fissures healed, and some posterior cervical adenopathy, which had in the mean time appeared, passed away. He left off coming for some time, but turned up again in June with scirrhus of the tongue. On this occasion he informed me that the fissures soon reappeared on leaving off treatment, but that in spite of the pain he smoked freely and also drank a good deal. The fissures became gradually deeper, and the tongue larger and harder, up to the date of his appearance. It was then found that the tongue was of stony hardness, with a large foul ulcer extending from the side deeply into its substance. As, however, there was no evidence of the glands being implicated, it was decided to remove the tongue, which I accordingly did in the manner advocated by my colleague Mr. Whitehead, viz. by passing the loop of wire connected with a galvanic battery over the tongue through a puncture in the floor of the mouth. On removal the tongue was examined, and found to be scirrhus cancer. The stump never healed perfectly, but, under the action of bromine, made some attempts in this direction. He expressed himself as much

* Nitrate of silver is generelly employed in too concentrated a form. The solid stick should scarcely ever be employed. As a rule, solutions containing a scruple of the salt to an ounce of water are capable of effecting all the good of a stronger solution without causing any of the distress which results from the use of a concentrated solution; nor, indeed, is the pain the only inconvenience which accrues from the employment of the solid nitrate. More than once I have seen most distressing enlargement of the lymphatic and salivary glands follow a too free cauterization of an ulcerated sore throat.

relieved by the operation, and up to the last never regretted its having been performed, as the pain of the tongue, which was so intolerable, in a great measure disappeared with that organ. Within six weeks of the operation the submaxillary glands were found enlarged, and the stump was freely fungating and very offensive. Saliva constantly flowed from the mouth, and altogether the poor fellow presented a sorry sight. What little could be done was done to relieve him, but he died six months after the operation, thoroughly worn out with pain and exhaustion.

This case presents an example of syphilitic ulceration running directly on into cancerous ulceration, guided thither by irritation and hereditary predisposition, neither of which alone probably would have been sufficient to determine its production. This, indeed, has longed seemed highly probable to me on *à priori* grounds, but I have not before been able to trace the evolution without a break. A practical point here suggests itself, viz. that, in cases when patients present themselves with a central hard lingual nodule which is considered cancerous, before proceeding to extirpation of the tongue, iodide of potassium should be given, as I have had the good fortune on one occasion to dissipate a gummatous mass by these means which had been condemned as carcinoma some time before.

REMARKS UPON A CASE OF FIBROID DISEASE OF THE LUNG.

By ARTHUR RANSOME, M.D., M.A. Cantab., Manchester.

A. B—, æt. 68, short, stout, of moderately temperate habits, indulging in a glass of whiskey and water at night. Had a life-history of cough. All his family had been subject to bronchitis or asthma, or to some form of chest affection. Two sisters died of "disease of the lungs," and one son died of phthisis, and another of "congestion of the chest."

As a boy he could never run without coughing, and had always had a cough in the winter since the age of twelve years.

In 1834 he was pronounced consumptive by a Manchester physician, and wintered in Italy, spending several subsequent winters in the south of England.

In 1836 he worked in a fustian factory, and the dust from the work greatly aggravated his cough.

For the last ten years, since a severe attack of influenza, he had coughed more or less constantly, occasionally suffering from very severe attacks of acute bronchitis, and twice from congestion of the lower lobes of the lungs, with rusty sputa.

Table I.—*Chest movements observed in the spring of* 1870, (*in* 100*ths of an inch.*)

	Mid-sternum.	*Lower Sternum.*	*Third Rib.*		*Fifth Rib.*	
			Right.	*Left.*	*Right.*	*Left.*
Forward	35	35	30	25	25	40
Upward	57	40	50	50	40	50

In the intervals between these attacks he had constant expectoration of thick yellow sputa, and at no time could he take a full inspiration without coughing. This circumstance made it difficult

to obtain stethometric measurements, but it was evident (see Table I) that the chest possessed a very large power of movement, considering his age and constant chest disorder.

Up to the last six or eight months he had no great difficulty of breathing, and could walk at a slow pace for several hours together. The physical signs were simply those of chronic bronchitis, and there was no dulness on percussion at this period. His kidneys also were healthy, and the heart only afforded slight indications of thickening of the aortic valves. In the summer of 1872, however, he seemed to lose strength, and in October that year he went to Southport, where he was exposed to very changeable, damp weather.

When he returned, early in December, he complained of great lassitude and pains in the back and loins. He was perceptibly thinner and much weaker; his liver slightly enlarged, complexion yellow, stools white. At the same time his cough was much better, and he had not had a severe attack of bronchitis for many months; in his own words, "his chest was better than it had been for many years." In consequence of his general symptoms and wasting, however, his chest was examined carefully, and on the right side, from the apex to three inches below the clavicle, and to the same extent behind, there was extreme boardlike dulness on percussion, bronchial breathing, and bronchophony, and a few scattered moist sounds were audible. There was no perceptible contraction of the ribs, nor displacement of the heart, though the cardiac impulse was much extended over the right side of the chest, and the heart-sounds were loudly conducted all over the consolidated region. The chest movements were as under, as well as could be ascertained for the coughing, which still prevented him from taking a full breath. The urine was healthy. There was no fever and no sweating. He slept well, but his appetite was very bad.

TABLE II.—

	Upper Sternum.	*Middle Sternum.*	*Clavicle.*		*Third Rib.*	
			Right.	*Left.*	*Right.*	*Left.*
Forward	20	25	15	15	30	35
Upward	20	20	15	13	45	40

From this time his weakness steadily increased. A number of bright red ecchymoses, like small nævi, were noted on the trunk. At the end of January he began to expectorate dark-coloured, very fluid sputa, like pus from a gangrenous wound—not putrid, but sickly of smell. The percussion was unaltered, but on auscultation there was abundant gurgling rhonchus and a peculiar clicking sound accompanying the heart's beat. His temperature at this time was 97·8, at 8 p.m. About February 5th there was slight œdema of the feet and legs, and he began to suffer from diarrhœa and symptoms of general congestion of the mucous membrane of the stomach and bowels, aphthous ulceration of the mouth, difficulty of swallowing, and burning pain in the stomach on taking food. He gradually sank and died on February 25th, 1873.

The post-mortem examination made fifty-five hours after death was very hurried, and restricted, by the request of the friends, to the lungs.

There was much subcutaneous fat; the ribs were remarkably elastic; and the costal cartilages soft for a man of his age, and healthy, not hypertrophied or ossified.

The heart was normal in situation and size.

The *left lung* collapsed on opening the pleura, and was healthy, with the exception of containing frothy mucus.

The *right lung*, in its upper lobe and half the middle lobe, was consolidated and firmly adherent by the pleura, which was about one sixth of an inch in thickness, hard and gristly, and so tough that a portion of the lung had to be cut out.

The interlobar pleura was also thickened, gristly, and firmly adherent to both lobes, and one or two prolongations of similar texture seemed to extend from the pleura into the lung; several of the bronchial tubes were also surrounded by a deposit of fibrous material.

These were the only indications of a commencing fibrosis of the lung. The lung itself was hardened, and sank in water, but still retained a portion of its vesicular character, but it was almost black in the upper lobe and half-way through the middle lobe, where there was a well-marked line where the colour changed from black to livid red. The tissue gave way under pressure with the

finger, and in the black portions it was honeycombed by a number of small vomicæ, varying in size from a pea to a hazel nut, and containing thin grey or bloody pus. There were no tubercles.

This case was interesting in both periods of its course; in the first as showing the tolerance by the human body of an extremely severe form of chronic bronchitis, not producing in this case either heart or kidney mischief, and not even terminating in emphysema or bronchiectasis.

The chest movements also were remarkably free for an old man, and showed an elasticity of the thoracic framework, which the post-mortem examination only confirmed.

After the disease had set in, the upward movements of the chest were somewhat diminished, not only over the consolidated lung, but over the whole surface.

The diagnosis of the case in its latter stage was sufficiently difficult, but the disease differed from ordinary phthisis in several particulars:

1. In its entirely unilateral character to the last.

2. In the peculiar boardlike dulness on percussion over the affected lung.

3. In the absence of fever, the temperature being lower than the normal standard.

4. In the absence of anything like colliquative sweating.

5. In the diminution of the bronchitic cough after the consolidation had taken place; and

6. In the peculiar character of the sputa.

Its distinction from cancer was much less certain, but there was no history of any hereditary predisposition to that disease. There was no evidence of any other cancerous deposit in the body, and there was no shrinking of the walls of the chest, such as would have been probable in the most common kind of cancer of the lung.

This last feature of the case, and its short duration, also went against the opinion that it was fibroid disease, but, on the other hand, the absence of contraction might perhaps be explained by the early stage of the disorder; and from the history of the case, the long-continued chronic bronchitis, and the absence of definite

signs of either disease, it was deemed most probable that it was an instance of fibroid consolidation terminating in softening.

It is probably not usual on post-mortem examination to find the lung in so early a stage of the disease, so far as the deposit of the fibrous tissue is concerned. The breaking down of the congested upper half of the lung and the diarrhœa would seem to have carried off the case before it had fully developed into a complete form of fibroid disease, but it may perhaps be all the more instructive on that account, and may throw some light upon the difficult question of the pathology of the disease, at least in some of its forms. It is hardly likely that the affection of the lung characterised by the presence of adventitious fibroid material always arises in exactly the same way. The various names that have been given to it by different observers would almost be sufficient to make one hesitate before pronouncing dogmatically on this point. The terms fibroid phthisis, cirrhosis, interstitial chronic inflammation, chronic pneumonia, themselves show the various views that have been entertained on the point.

In the instance before us there were no very large dilatations of the bronchial tubes, and therefore the complaint could not have arisen, as Laennec supposed, from the presence of bronchial cavities; nor was it the result of pleuritic effusion, as it was found at the apex of the lung and the vesicular character was still partially retained.

There were no signs of the thickening of the general fibrous tissue of the lung, such as is found in cases of cirrhosis of the liver, and there was no reason for suspecting the presence of a general fibrinous diathesis, as in the case recorded by Dr. Andrew Clark.

From the early history of the patient it seems most probable that the fibroid deposit was simply the result of violent and continued irritation.

We may perhaps surmise that, at the time of the suspected tubercular consolidation of the lung in 1834, there was already some pleuritic adhesion around the right upper lobe. This might remain for many years without causing inconvenience or any further structural change in the underlying lung; but as the patient became more and more subject to attacks of acute bron-

chitis, with violent cough, and to almost constant bronchial irritation in the intervening periods, the pleuritic affection would gradually become intensified, thickening and contraction would take place, and this morbid action might spread to the connective tissues, not only in parts continuous with the pleura, but to the interlobular tissue.

Dr. Wilson Fox, in his able account of the disease in 'Reynolds' System of Medicine,' doubts "whether there can be any destruction of lung independently of a superadded pneumonia;" but we may easily imagine that the almost constant bronchial congestion, and the compression of the lung tissue by the contracting fibroid growths, would greatly favour the onset of pneumonia, and would soon cause it to terminate in disorganisation and destruction of portions of the lung.

The consolidation of the lung and formation of vomicæ were probably the work of the last six months of the patient's life.

With regard to the question of the hereditary transmission of this disease, it may be interesting to note that this patient's daughter died some months afterwards of uterine hæmorrhage; and as she had shown signs two years before of consolidation of the right upper lobe, the lung was examined after death, and the apex was found condensed and covered by an adherent, much thickened pleura, but there was no trace of tubercle to be discovered.

CASE OF IMPERFORATE RECTUM.

By JOHN GRIMES, M.D., B.Sc. Lond., Grassendale, Liverpool.

The special difficulty in the treatment of those cases of atresia of the lower bowel, where a natural anus exists, opening into a pouch formed by the last portion of the rectum, but where a considerable interval occurs between this pouch and the upper portion of the rectum, consists in the uncertainty as to the position of this upper portion aud the possibility of repeated failures in the attempt to reach and establish a communication with it.

I believe that, in the absence of any indication of the exact position of the bowel, if the needle of an aspirator be pushed in the direction where it is most likely to be met with, then, in case of failing to reach the bowel at the first attempt, a second and possibly even a third and fourth attempt might be made in slightly different directions, without doing such an amount of damage as would preclude the possibility of the child's surviving in case the bowel were eventually reached. Probably, also, in those cases where, fortunately, the bowel is reached at the first attempt, the infant suffers less from the shock produced by the small and bloodless wound of an aspirator needle, than it would if a knife were used, or a trocar the canula of which would be large enough to allow the free escape of the viscid meconium. These were the chief considerations that led to the use of the aspirator in the case which forms the subject of these notes.

The patient was a male child, born on the 26th of June, 1874, to all appearance perfectly healthy and well formed. The anus presented an entirely natural appearance, so that my attention was not drawn to the defect till I was informed, twenty-four hours after the birth, that there had been no evacuation of the bowels

beyond a slight discharge of mucus. In administering an injection of warm water, I found that the small tube of the enema bottle passed readily into the bowel, but the water was instantly and forcibly expelled by the side of the tube. I introduced my little finger, which passed up for about two inches into the rectum, and then came to a funnel-shaped constriction, which seemed to narrow to a point. On repeating the examination the next morning, the cavity appeared to be considerably diminished in size by the descent of the apex of the constricted portion, so that the upper wall was now pressed close down to the anus. This upper wall gave a sense of fulness and resistance, but no fluctuation nor any indication of being thinner at one place than another.

I procured the assistance of Mr. Mitchell Banks, who recommended that, as there was no point which obviously presented itself for puncture, we should wait. The next day, June 29th, the cavity seemed still smaller, and there was less room to introduce the finger, but there was still no pointing. We then considered that no advantage would be gained by further delay, and decided to make a puncture in the direction where the upper portion of the bowel might be expected to be found according to the normal anatomy of the parts. Mr. Banks did this with an aspirator needle, on the stem of which was placed the canula of a hydrocele trocar, which (fortunately for our purpose) exactly fitted the needle. A vacuum being produced in the receiver, moderate steady pressure was made on the abdomen of the child, and this, together with the cry of the child, caused a barely perceptible bulging of the upper wall of the anal cavity. Into the bulging portion Mr. Banks inserted the needle, and pressing it carefully onward presently had the satisfaction of seeing a viscid black fluid oozing through the glass tube of the aspirator. The canula was then pushed forward over the point of the needle, and left in the bowel when the needle was withdrawn, being secured by a pad fixed with tapes to a strip of strapping round the hips. A piece of gum-elastic catheter of slightly larger diameter than the canula was substituted for it next day, and each day subsequently a size larger was used, up to No. 12, then little tubes of vulcanite of

increasing sizes, and after these a series of bougies, which at first were left in continuously, but after the first fortnight from the operation were only kept in a short time, being inserted at intervals first of twelve, then of twenty-four hours.

In six or seven weeks, by a very gradual increase in the size of the bougies, as large a one was inserted as the sphincter of the bowel would conveniently admit, and for a few weeks more the finger was occasionally introduced to make sure that the opening was not contracting. The cure was then considered complete.

Throughout the treatment the child throve well, and appeared to suffer very little inconvenience from the frequent manipulations. Enemata of warm water were occasionally required while the opening was yet very small, and were injected with a No. 2 catheter inserted through the tube in the bowel.

It is worthy of notice in this case how the extremity of the bowel, originally somewhat high up in the pelvic cavity, was gradually forced down till close to the anus. At the first examination the anal pouch extended upwards nearly two inches, and there was no definite indication of the position of the bowel above. At the time of the operation the upper wall of the anal pouch was pressed close down to the anus, but there was a depth of about three quarters of an inch of tissue between the pouch and the bowel. As the opening in this tissue widened it became less deep, and in a fortnight the septum was not more than half its original thickness, and eventually it became little more than a membrane lying close above the anus; so that if further interference should be necessary, it will be rendered easy by the ready accessibility of the constriction.

ON INJURIES TO THE URETHRA.

By REGINALD HARRISON, F.R.C.S.,
SURGEON TO THE LIVERPOOL ROYAL INFIRMARY.

Laceration or rupture of the urethra is, under all circumstances, to be regarded as a serious lesion.

In the first place, it may expose the patient to all the dangers incident to the extravasation of urine in a part where such an occurrence is attended with imminent danger to life, and subsequently it is often the source of extreme discomfort in leading to the formation of a stricture which, more than any other, is difficult to control.

With a view of making a few observations on the treatment of these injuries, I purpose narrating the following cases which I have collected:

Case 1.—A labourer, æt. 20, was admitted into the Northern Hospital under my care in August, 1866. Eighteen hours before admission he had received a kick on the perinæum. Blood issued from the orifice of the urethra, and he shortly afterwards found himself unable to pass water. For this he applied at the hospital. With some difficulty a No. 7 catheter was introduced, a distinct laceration being felt about the bulb. Two pints of bloody urine were removed, and the catheter was then retained in the bladder. No farther difficulty was experienced. The patient made a good recovery. A contraction about the lacerated part ensued, and for several months the patient attended as an out-patient for the purpose of having the urethra dilated by bougies. Eventually he was lost sight of, some contraction then remaining.

Case 2.—A dock labourer was admitted into the Northern Hospital under my care in 1866, having fallen from a height astride over some scaffolding.

On admission the perinæum was bruised, and blood was passed by the urethra. On introducing a catheter a rupture of the urethra, about the triangular ligament, was made out. The laceration did not appear completely to sever the urethra, for with a little trouble the catheter was introduced into the bladder. In this position it was retained, and up to the fifth day the patient appeared to make satisfactory progress. On this date, however, the patient became feverish; the perinæum was found swollen, and there was much pain about the part. Under these circumstances I opened the perinæum freely, dividing the urethra forwards from the apex of the prostate. Vent was thus given to disorganized clots, and some fetid pus, and a certain amount of immediate relief was afforded. On the ninth day from the injury there was a rigor, and the patient rapidly succumbed with well-marked symptoms of pyæmia. I was only able to inspect the injured part after death, when I found that the urethra had been almost completely, though irregularly, ruptured in the membranous portion. There were also signs of rapidly extending pelvic cellulitis.

Case 3.—About the same time as the previous case a sailor was under my care at the Northern Hospital for very similar injuries caused by falling across a rope.

Here the signs of a rupture of the urethra in its deeper part were equally unequivocal. With some difficulty I introduced a grooved staff, and freely laid open the perinæum and urethra to an extent sufficient to secure a free vent for the urine.

The patient made a good recovery, and the perinæal wound completely healed. During the healing process bougies were regularly introduced. I saw the patient not long ago, and he complained of suffering no inconvenience from his accident. The urine was voided in a natural stream.

Case 4.—A 'bus conductor, æt. 17, was admitted into the infirmary under my care in 1869 with the following history. Seven days before admission he was kicked on the perinæum; this was followed by slight hæmorrhage from the urethra, but he was able to pass his water.

On the day of his admission to the infirmary (the seventh from

the accident) the hæmorrhage recurred, and he had retention of urine. A No. 9 catheter was introduced, and a considerable quantity of urine withdrawn. Two days after this he became feverish, the perinæum was swollen, and there was some pain about the part. To relieve this a free incision was made into the urethra along the central raphe, through which all urine passed. This was followed with relief. He made a good recovery, and left the infirmary with the perinæal wound completely closed. The urethra appeared to be lacerated about the membranous portion along its lower wall. During the process of healing, bougies were introduced in increasing sizes. He left the hospital with a urethra admitting a full-sized bougie, and I never heard afterwards that he suffered from stricture.

Case 5.—A stonemason was admitted into the infirmary under my care in 1870. He had fallen across a sharp stone, considerably bruising his perinæum.

On his admission he had the usual symptom of lacerated urethra, viz. blood issuing from the orifice of the urethra, and retention of urine. A catheter disclosed a considerable rupture about the deep perinæal fascia. I accordingly laid open the perinæum freely in the middle line, giving exit to clots and forming a passage for the urine to escape.

The patient had rather a sharp attack of orchitis, but with this exception made an excellent recovery. The treatment consisted in the regular introduction of bougies whilst the perinæal wound was healing. When he left the infirmary the perinæal wound was closed, and the urethra of its natural size. I saw him some months afterwards, and he remained quite well without any sign of stricture.

Case 6.—This patient, a boy, æt. 11, I saw with Dr. Little, of Everton. The patient had been crushed by a carriage, and had evidently sustained some severe injury to the pelvis as well as to the urethra. He had complete retention, and we were unable to get the catheter further than the deep fascia, where the urethra appeared to be completely severed. Under these circumstances we agreed that a free perinæal incision was required, and this I accordingly made. A considerable quantity of urine and extra-

vasated blood escaped. A fracture of the pubic arch was also discovered. For several weeks the patient remained in a very precarious state, as the injury was followed by an acute attack of peritonitis, and for weeks all urine escaped by the wound. As soon as the patient's health permitted it, I attempted to establish the continuity of the urethra; the canal having been completely severed the distal end closed. This was a very troublesome affair, but eventually it was accomplished, and the perinæal wound completely healed. I had the patient under observation for nearly eighteen months, and when I last examined him, though the urethra admitted a full-sized bougie, yet the point of injury was rough and cicatricial, so that I fear there will be some permanent contraction.

In reference to the question of treatment, the cases I have recorded justify a conclusion that in all such injuries external incision, or, as it is more commonly called, perinæal section, is the safest plan of proceeding, recommending itself on the following grounds:

1st. Because of the impossibility of accurately determining the extent and direction of the laceration.

2nd. Because incision is the surest means of preventing extravasation of urine; and

3rd. Because incision diminishes the risk of a stricture forming, or, at all events, moderates the severity of such a formation.

The relative position of a laceration to the deep perinæal fascia is a matter of the first importance. Were it possible in all cases to arrive at the conclusion that the lacerated portion was anterior to the deep fascia, provided a catheter could be introduced into the bladder, it would be safe to treat the injury without incision, resorting to such a proceeding should signs of extravasation of urine appear; for, under these circumstances, the direction taken by extravasated urine is forward towards the scrotum, where it renders itself unmistakably apparent from the moment of its occurrence. Where the laceration is behind the deep fascia, the extravasation, should it follow either immediately or in the course of a few days, is of a much more serious nature, inasmuch as the

urine takes a backward direction towards the pelvis, setting up cellulitis, which speedily goes on to suppuration. Here it is much more subtle; it may be going on from the moment of the injury, not declaring itself until it has occasioned pelvic cellulitis.

The former variety of extravasation is usually amenable to treatment, but the latter, where it has actually occurred, is most frequently followed by a fatal result. Case 2 illustrates this, and Case 3, though the patient was saved, undoubtedly is a similar example. Inasmuch, then, as the precise position of the laceration, whether it is a few lines in front of the deep fascia, or a few lines behind it, determines in a great measure the after-consequence, so far as extravasation of urine is concerned, is it not better to act on the safe side in these cases of deep laceration and anticipate the risk of retrograde extravasation?

The second proposition that incision is the safest means of preventing extravasation naturally follows on admitting the impossibility of precisely determining the position of the injury to the deep fascia. No other plan than that of opening up the injured spot and thus forming a direct course for the urine to escape can be relied upon. In instances where the urethra is completely torn across it is usually impossible to introduce a catheter, and here, under all circumstances, the line of action is evident enough. Where a catheter can be introduced it may be objected that incision is unnecessary, but it must be remembered that the constant presence of such an instrument in the bladder is no safeguard whatever against the occurrence of extravasation, whilst its continual pressure on the swollen and inflamed urethra at the part injured is likely to be followed by sloughing of the canal and a proportionate extension of any subsequent stricture.

In reference to the third conclusion that incision diminishes the risk of stricture, or moderates the extent of such a formation, it may be stated generally that the worst forms of stricture are usually those following laceration of the urethra, and when we consider the circumstances under which such wounds heal where no artificial vent is provided, this is not to be wondered at. The wound in the urethra is more or less lacerated, it heals under the irritating influence of constant contact with urine, and inordinate

plastic exudation is usually thrown out in and around the wound. On the other hand, in cases where the urethra when lacerated is opened by perinæal incision, we have still the original injury; but the circumstances are more favorable for limiting action. Free vent is here given for all that proves of an irritating nature, and the exudation lymph is merely sufficient for coating over the incised tissues. These cases usually heal up as kindly as wounds inflicted on the urethra in the operation of lithotomy, where stricture seldom occurs.

The after-management of these cases consists mainly in great attention to cleanliness, and after the lapse of a few days the regular introduction of bougies until the perinæal wound is completely healed. It is as well to continue the introduction of the bougies at longer intervals of time until all signs of the injury have completely disappeared.

NOTES OF A POST-MORTEM EXAMINATION

IN THE

CASE OF A PATIENT IN WHOM LUMBAR COLOTOMY HAD BEEN PERFORMED FIVE YEARS PREVIOUSLY.

By MICHAEL HARRIS, M.B. Lond.,
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The following notes were made at the autopsy of a patient on whom Mr. Hakes had performed Amussat's operation of lumbar colotomy on March 30th, 1869, for vesico-intestinal fistula. The case was fully reported by Mr. Hakes in the 'Liverpool Hospital Reports' for 1869, and it certainly presents more than usual interest, as it is rare that an opportunity occurs of making a complete post-mortem examination of the abdominal viscera in a case where an artificial anus has existed for so long a period.

The history of the patient subsequent to his leaving the hospital in 1869 may be stated in a few words. For about three years he enjoyed good health, acting as omnibus conductor, suffering very little inconvenience from his artificial anus; but twelve months or more before he died he had, from time to time, suppurations about the rectum and urinary symptoms, and was in the infirmary once or twice previous to his last admission, when he was evidently extremely ill, and was supposed to be suffering from some form of blood-poisoning. He died after having been an in-patient for a few days.

Autopsy fourteen hours after death.—Rigor mortis was still present in the lower extremities, but had passed away in the other parts of the body. The body was fairly nourished. There was no œdema of the lower extremities. The abdominal cavity was first opened. There was some local peritonitis over the upper and

lower surfaces of the liver. The whole of the large intestine and a small part of the ileum, together with the skin surrounding the artificial anus in the left lumbar region, were then taken out.

The artificial anus (A), which easily admitted the index finger, was found only to communicate with the transverse colon (B); there was no communication whatever with the remains of the descending colon, which, together with the sigmoid flexure, had become completely obliterated; in fact, that portion of intestinal canal which extended from the artificial anus to the point at which the recto-vesical fistula had existed was found to be replaced by a cylindrical mass of fat (C), having a diameter of about an inch, which was, no doubt, the representative of the descending colon and sigmoid flexure, as it was in direct continuity above with the part of the colon that terminated in the artificial anus, and could be traced below to a cicatrix (D) in the posterior wall of the bladder, which was evidently the point at which a previous fistula had existed. The length of this fatty column was about six or seven inches; in the centre of it was found a fibrous cord of about a line in thickness, which was thought might possibly be the atrophied remains of the intestine. It was carefully hardened in chromic acid, and sections of it were made, both by Mr. Rushton Parker and myself, but with an entirely negative result. No trace of a canal of any kind could be detected in this fibro-areolar cord.

The rectum and bladder were removed and I afterwards dissected them out, and the following appearances presented themselves. About two inches from the natural anus a tight stricture existed (E), which had reduced the calibre of the canal to about the size of a goose-quill. A probe was then passed through the strictured part for the distance of about five or six inches, where the rectum was found to terminate in a *cul-de-sac* (F), which corresponded with the cicatrix of the old recto-vesical fistula. An extensive cicatrix (G) existed at the lower part of the rectum, the calibre of which above this cicatrix was scarcely larger than an ordinary quill. At (H) about four inches from the anus a small *cul-de-sac* existed; this, however, had never communicated with the bladder. The wall of the rectum was not abnormally

thickened except at the strictured portion (E), where some induration of the wall was present.

The bladder was next opened by a vertical incision through the anterior wall; in the posterior wall, about two inches above the entrance of the ureters, was seen a fossa (D) which admitted the tip of the forefinger and the bottom of which consisted of cicatricial tissue. The site of this perfectly closed fossa exactly corresponded with the lower end of the fatty mass representing the sigmoid flexure (K) and the upper end of the rectal *cul-de-sac* (F).

Several hæmorrhoids (M) existed.

There was a considerable amount of new connective tissue between the lower part of the rectum and the bladder. The bladder in the region of the trigone was much congested, and the mucous membrane presented a granular appearance. The urethra was healthy except in the prostatic portion, which was congested, and to the right of the sinus pocularis there was a fistula (N) which communicated with the perinæum.

On the application of iodine the wall of the great intestine showed extensive amyloid degeneration; the small intestine was only affected to a slight extent.

The kidneys had undergone extensive lardaceous change, the weight of the two being 29 oz. In the medullary portion of the left kidney an abscess about the size of a walnut existed, but the nature of this, whether syphilitic, tuberculous, or otherwise, was not very apparent.

The liver was lardaceous, but to a much less extent than the kidneys. No enlargement of the lumbar glands.

Testes healthy. No syphilitic deposit was present in these or in any others of the viscera. There was a small abscess in the right epididymis.

Thorax.—Heart healthy. Slight atheroma of aorta.

Lungs healthy. In the right pleura there were some recent adhesions.

Brain healthy.

Remarks.—The cause of death in this case was sufficiently evident from the post-mortem appearances. I think there can be

little doubt that the patient died from uræmia as a result of the extensive degeneration of the kidneys. Whether the amyloid disease of the viscera was due to syphilis, or was a consequence of the long-continued suppuration which had been going on about the perinæum in consequence of the urinary fistula, I do not think can be definitely decided. Most probably both causes aided materially in the production of the lardaceous disease.

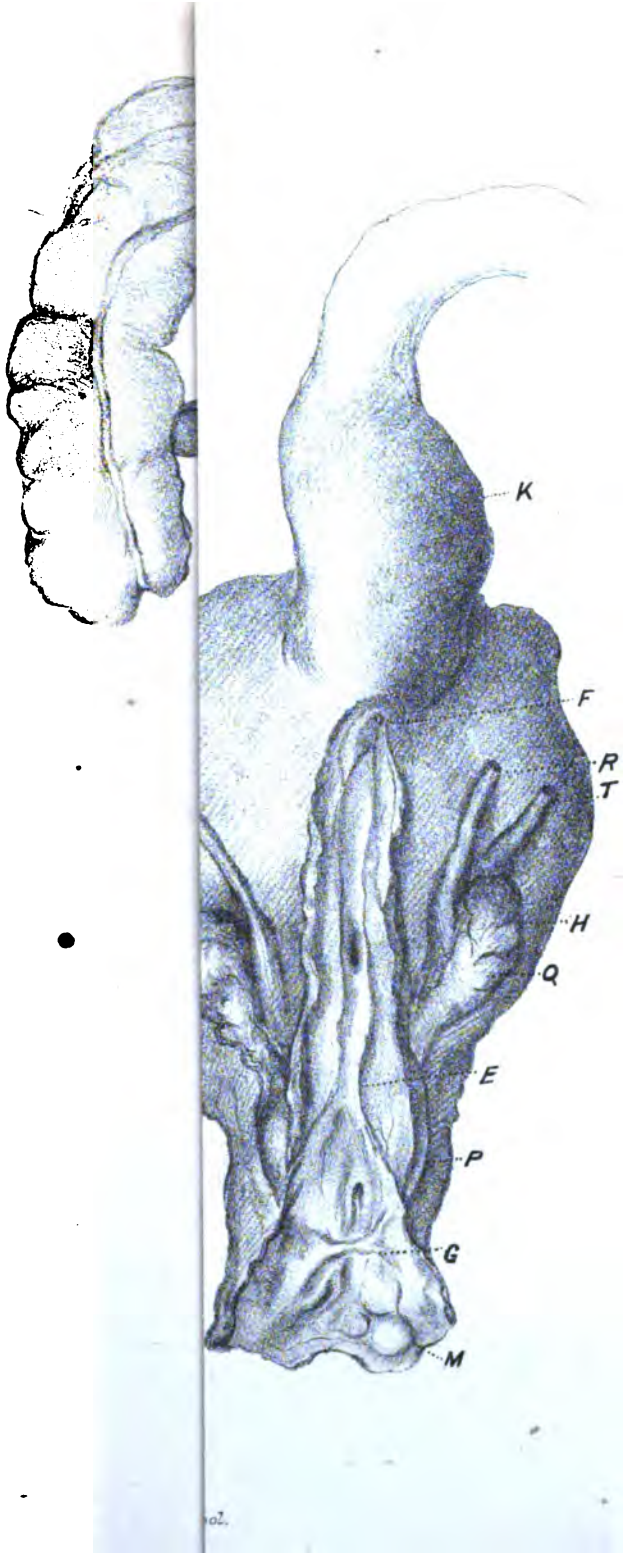
The most interesting point in the whole case is doubtless the total atrophy of that portion of the intestine between the artificial anus and the cicatrix of the recto-vesical fistula. That a considerable amount of atrophy should take place in a portion of the colon which was no longer performing its normal functions is what the simplest laws of physiology would lead us to expect; but that mere disuse should cause complete disappearance of the intestinal tube, nothing remaining in its place but a fibro-areolar cord surrounded by a column of fat, is, I think, somewhat unusual and worthy of being placed on record, more especially as I have failed to find in the literature of the subject any case quite similar to the one under consideration. The records of several cases are to be met with in the works of Curling and other authorities, in which the patient has survived the operation of colotomy for several months, but in none of these was an examination made after death. The only cases on record in which autopsies have been made seem to be those in which death took place very shortly after the colon had been opened. It should be remembered, however, that the obliteration of the intestine observed in this case in no way differs from that which is met with shortly after birth in fœtal structures, such as the ductus arteriosus and the hypogastric arteries.

I have appended to this paper a sketch of the dissection described.

DESCRIPTION OF PLATE.

A. Artificial anus.
B. Transverse colon.
C. Fatty column representing the descending colon.
D. Cicatrix at the site of the old recto-vesical fistula.
E. Rectum cut open along posterior surface. The letter points to the narrowest part of the rectum.
F. Cul-de-sac.
G. Cicatrix.
H. Cul-de-sac in anterior wall of rectum.
K. Fatty column in the position of sigmoid flexure.
M. Hæmorrhoid.
N. Perineal fistula.
P. Prostate divided through the anterior part in front.
Q. Vesiculæ seminalis.
R. Vas deferens.
T. Ureter.
V. Ileum and vermiform appendix.

The drawing to the right represents the actual size of the preparation, that to the left is drawn to a scale of about one half.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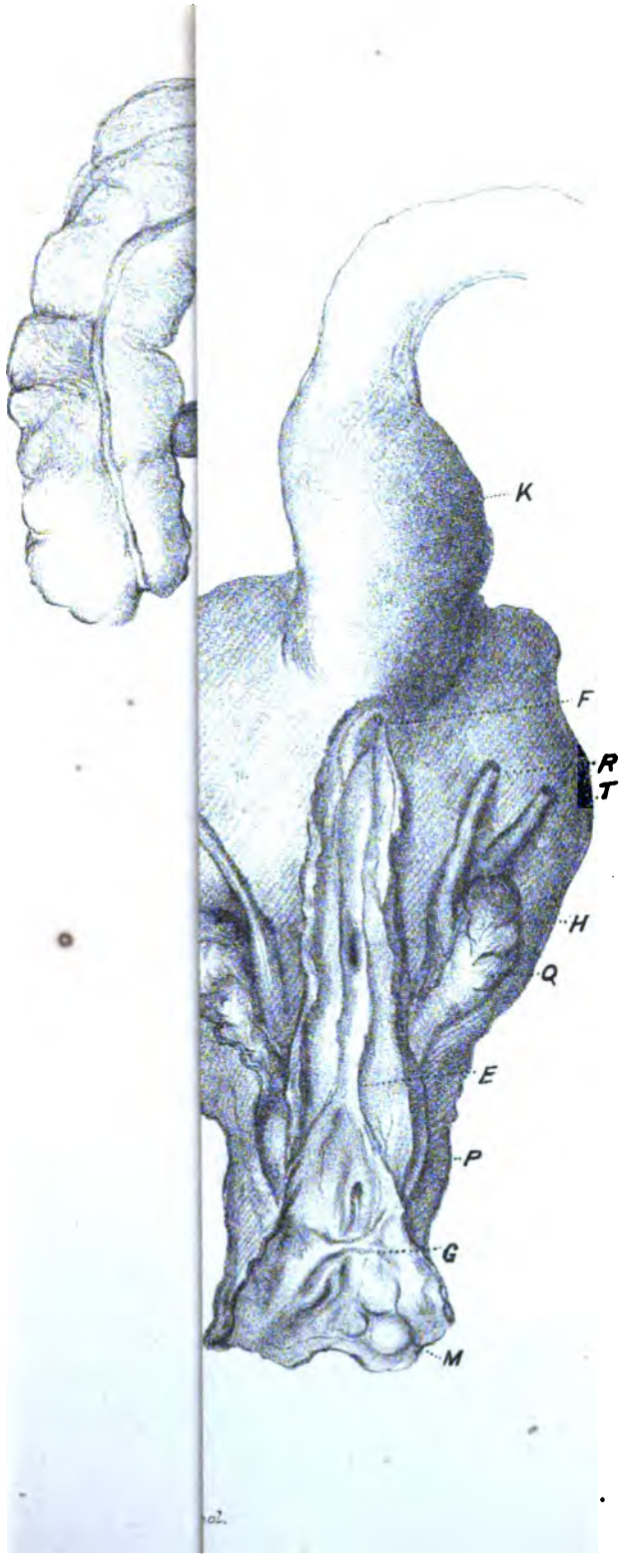
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CERTAIN DIFFICULTIES IN THE PERFORMANCE OF SYME'S PERINEAL SECTION.

By EDWARD LUND, F.R.C.S.,
ONE OF THE SURGEONS TO THE MANCHESTER ROYAL INFIRMARY, AND MEMBER OF THE SENATE OF THE OWENS COLLEGE, MANCHESTER.

Unless guided by the hand of a Syme, to pass the catheter in the operation of perineal section, or to replace it a few days afterwards, is often a matter of extreme difficulty, and will try the skill and patience of the surgeon, if it do not even jeopardise the ultimate success of the operation. This, however, is but one of many difficulties to be encountered in this operation; and having had to contend with them myself, and at length, I hope, overcome them, I am anxious to explain to other workers in practical surgery the mode of operating which I now adopt. I trust that I shall not be accused of egotism if I do so without comparing, at each stage of the treatment, other means which may have been employed for similar ends.

First, as to the propriety of the operation and the cases to which it may seem to be especially suitable, I may state that I confine it almost entirely to cases of old undilatable stricture of the urethra, in which the tissues about the perineum are the seat of much chronic induration, with perineal, scrotal, or penile fistulæ, and in which, as a necessary attendant upon such conditions, the strictured portion of the urethra has been so narrowed as to constitute the tunnel-form rather than the annular or ring-shaped stricture. This latter, it is well known, is rarely the result of injury, but much more commonly arises from previous inflammation. It is in this form, which is often spoken of as organic to contrast it with the traumatic form of stricture, that we may very

generally do much good by gradual dilatation, and even complete the cure by Holt's immediate method, provided there be no renal complications.

As to the success of the operation I am about to discuss, I know that surgeons have differed greatly in their opinions as to its value, and this, no doubt, has depended on the difficulty or facility with which the operation has been performed and the treatment completed in any given case. Assuming, therefore, that a suitable case has been selected for what is now so well known as Syme's perineal section, the plan I pursue is somewhat after the following system.

First, I investigate, as far as possible, the condition of the urinary organs in reference to the kidneys and the mucous membrane of the bladder. The latter will, of course, in many cases, have assumed a permanently unhealthy condition from long retention of urine within its cavity, by reason of the contracted outlet, which may lead eventually to the production of what some writers have called the surgical kidney; that is, disease slowly advancing from the mucous membrane of the bladder along the ureters, which become dilated, and reaching the pelvis of the kidney. This, under repeated attacks of retention, will be injured by inflammatory change set up in the obstructed ducts of the kidney itself and the delicate system of its secreting portion. When in our preliminary examination of these cases we detect albumen in the urine, it is often difficult to decide whether it is derived from muco-pus from the bladder, or has been secreted by temporary congestion of the kidneys, or whether it be indicative of positive structural change in these organs. I have for a long time taken as my guide in these cases the specific gravity of the urine, where it is possible to estimate it from the daily average, unless the presence of renal casts or oil-globules should give unfavorable indications, and before proceeding to operate I collect the whole secretion of twenty-four hours, and judge from it as to the specific gravity. If, together with the presence of albumen, there be a constantly low specific gravity, say, never reaching above 1·010, the patient not taking more than the average quantity of fluid per day, I should look with great suspicion on such a case, and

feel very indisposed to proceed to operative interference. If, however, the albumen were in the same proportion in another case, but the average weight of the urine passed per diem was from 1·015 to 1·022, I should have no hesitation in dividing the stricture. It seems to me that the dangers we have to fear in diseases of the kidney, viewed in the light of surgical operations, arise not so much as might at first appear from debility consequent upon continued loss of albumen, as from the risk we run that, while the patient is suffering from the shock of a recent operation, the kidneys, influenced like all the other glands in the body, through the sympathetic system, suddenly cease to secrete from the blood those matters which they ought to eliminate in such proportion as must be compatible with life. For, in such cases, even before the operation, as proved by the low specific gravity of the urine, the quantity of matters secreted was at the minimum, and therefore these secreting powers being still further diminished, the kidneys fail to remove a quantity sufficient for the continuance of healthy function. For in such cases is it not the accumulation of urea in the blood more even than the sudden cessation of flow of urine which are the gravest of all symptoms with which we have to contend? And is it not then that we observe slowly yet surely creeping over our patient a confusion of intellect with that passive apathetic state which so quickly terminates in coma and in death? Thus, as I have already said, next to the structural change which necessitates an operation for division of the stricture, the amount of induration around the urethra, the numerous fistulæ, and the continued trouble produced by the abnormal passage of the urine—above all these things, we must consider the condition of the kidneys as determining whether or not the operation of perineal section should be performed. There are, of course, cases where the patient is entitled to the benefit of the doubt, and if the risks of the case be put fairly before him, we may then feel ourselves in some way relieved of responsibility in urging the patient to submit to the operation of perineal section, as far as a question of ultimate result; but still I regard the condition of the kidneys as a thing to be looked to more than the actual state of the

urethra. Now, in order to prepare the urethra for the passage of the director at the time of the operation, which it is essential should be accomplished in this form of perineal section, and when it is impossible, by reason of the smallness of the stricture or the presence of numerous false passages, to pass a fine bougie or catheter into the bladder, I have found it an admirable practice for a week or ten days previous to the operation to desist entirely from any such attempts, and to adopt the plan which, I believe, was advocated by the eminent surgeon who designed the operation I am discussing, viz., no longer to use a small instrument, but to proceed at once to dilate as fully as possible the whole of the urethra in front of the stricture, and there to establish a dilated condition of the passage similar to what we know must exist in the urethra behind the stricture by reason of the pressure of retained urine. I begin with as large a bougie as can be fairly passed along the passage, not being satisfied with less than No. 8 or 10—if possible a larger than this—and pass it each day down to the face of the stricture, holding it there for ten or fifteen minutes. If, after two or three such applications, it passes a greater distance as if the urethra were expanding on the anterior side of the stricture, I would then for the remaining few days use a still larger size. I believe this has a very beneficial effect; it so separates the sides of the passage as to draw the mucous membrane away from the strictured part of the canal and enlarge the little orifice, which must still be present at the end of the *cul-de-sac*, like a hole in the bottom of a cup. When the time arrives for the operation, and everything else has been prepared, it becomes the duty of the surgeon, or his assistant, to introduce the Syme's grooved staff, in which it will be remembered one part is made extremely small, equal in the curved portion to a No. 2 or 3 catheter, the shaft of the director being equal to a No. 8 or 10. As soon as the instrument is brought down to the face of the stricture, with the urethra prepared by extreme dilatation as I have described, it is wonderful to notice how readily, in most cases, a urethra which ten days previously would not permit in any way the passage of a small catheter will now receive the narrow portion of the director,

and we may slip it on through an indurated stricture into that wider portion of the canal which leads to the bladder.

It is hardly needful here to say that previous to commencing this operation it is desirable the patient should be prepared in the way now so generally adopted in all important surgical operations; that is to say, attention should be paid to the condition of the heart, lungs, liver, and digestive organs; the bowels should be emptied, especially the rectum, by an enema; the patient should be placed on a mild diet for a few days previously; and I think it a good plan to insist that he should remain in bed or in a perfectly recumbent position for at least three days before the operation. With this, and the use of aperients (particularly if of a saline nature), we can diminish any congestion of the veins of the pelvis and the hæmorrhoido-prostatic plexus and the vascularity of the urethra and the parts near the neck of the bladder. As might be expected, it will contribute much to the ultimate success of this operation if the patient be of a quiet, tractable disposition, for it is well known that even the retention of the catheter within the bladder is very irksome to some persons, while with others it excites no complaint whatever.

In this operation, as in all others upon the urethra and perineum, it is desirable that we should select an operating table so placed as to be well opposite a good light, that in the progress of the operation the effect of each incision we make may be clearly seen.

The position in which I place the patient is that used in the operation of lithotomy, and I retain him in it by the same means as in the operation for stone; that is, I employ the wristlets and anklets of Mr. Prichard, of Bristol (referred to in the 'British Medical Journal,' 22nd December, 1860). These I have used in all my stone operations for many years, and find them in every way quite as effective and much more convenient than the old-fashioned tapes with loops and pins formerly employed. They are put on whilst the patient is being placed under chloroform, and the perineum prepared by being cleansed from all secretions and by the removal of any superfluous hair. It now becomes necessary for

either the surgeon or his assistant to introduce Syme's director; and here it is of the utmost importance that we should be quite certain that the point of this instrument really passes into the bladder; for only those who have had experience in this procedure can bear testimony to the extreme difficulty, which sometimes arises, in being quite sure, whether or not, the director has taken the right course.

I believe although we may be satisfied that the point of the director is in the prostatic portion of the urethra, as we can prove by examination through the rectum, yet it may have travelled along some false passage in the prostate itself, which some previous catheterism has unfortunately produced, and having thus pierced the prostatic tissue its point may project up into the cavity of the bladder. The question thus arises, Will such a state of things be a bar to the progress of the operation? Although I am willing to admit it would be only in exceptional cases that we should overlook such a condition, from cases which I have seen, yet I know it is possible that the operation may be brought to a successful issue even though the beak of the director be in this abnormal position. The usual test, that the point of the instrument lies loose in the bladder, of course is, that, while we can only feel it per rectum through the dense tissue of the prostate, we can rotate it easily on its own axis from side to side, and so prove that the apex is free to move within the bladder. The most important thing to determine is that the point of the instrument, after passing through the membranous portion of the urethra, has not diverged either to one side or the other, or more likely backwards or downwards into the loose tissue between it and the prostate or the rectum. Here, of course, it would be appreciable to the touch of the finger when examined by the bowel, and in such a case on no account should we proceed with the operation. The only exception, therefore, which I have allowed to the rule that the operation is not to be proceeded with unless the point of the catheter moves freely in the bladder, is in those rare cases where, as I have just said, we have reason to think it has entered an old sinus in the prostatic portion and there become in some degree fixed. The instrument is now given into the hands of the assistant, to be held by him in

somewhat the usual position of the staff in lithotomy (only placed so that the groove may point directly towards the operator, not in any way giving it a lateralised direction), and the operator has to satisfy himself that the curve of the director or the thick portion of its stem can be felt deeply in the middle line of the perineum. If there be much induration this will be impossible in many cases; and it is therefore imperative on the operator to proceed in a very cautious manner in his first incisions. My plan has always been, and I first learnt it from the late Mr. Dumville—who for many years enjoyed a well-earned reputation for the special performance of this operation, and no one whom I have seen accomplished it more rapidly or with better results—to make my first incision from above downwards, exactly in the middle line of the perineum; not by plunging the knife into the perineum in front of the rectum, and then cutting forwards as some surgeons have recommended.

In the selection of the knife for this purpose I have found it is far easier to do it with a long narrow-bladed knife than with a broad one. The knife I always use is what is known as a finger knife, with a blade not much more than a quarter of an inch in width, and from two to two and a half inches in length. It is true that the cutting surface of such a blade is not needed for more than one inch from its point, and that its length may seem to be unnecessary, but the advantage of the long narrow blade is that, while it lies by the side of the index finger which guides it in the deeper portions of the incision, it does not conceal the view, whereas, with a shorter and wider one, of the ordinary scalpel form, the blade, as well as a portion of the handle, might be buried in the wound. It is generally needful to make more than one cut in the middle line, beginning about one inch and a quarter in front of the anus and continuing it backwards about an inch. As I proceed I seek, from time to time, for the director in its cylindrical or its grooved portion, and it is very important to take care that neither by habit, as in the operation for lithotomy, nor by mischance, we do not, when the moment arrives for opening the urethra, cut into it on the side, instead of on its front aspect exactly in the middle line. It is want of

care here which I think often leads the operator to slip by the side of the small portion of the director, and thus to miss the true position of the groove. As soon as, guided by the nail of the left index finger, I can make out any portion of the groove, I follow the plan which Mr. Dumville so often referred to, viz., that while up to this time the knife has been used with its back upwards and towards the operator, and is still held in the groove in which we are sure it is fixed, by the inability to move it from side to side, it is now made to turn round upon its point until the edge of the blade points upwards, and then by carrying the handle well backwards (having taken care that the pelvis of the patient hangs well over the edge of the table), the point can be made to travel along the groove of the staff, and cut the urethra just at that part where the shoulder of the cylindrical portion can be felt. It is very often difficult to do this, but the difficulty, I think, depends upon the way in which the knife is held. It is not an easy thing to run the point of a knife such as I select, along the groove of the steel director of which we are now speaking. Whether or not it is because the knife blade is of hard steel and the groove in the director of softer metal, yet so it is, that they are very apt to stick or hang together if we allow the point of the knife to impinge upon the surface of the groove at anything like an obtuse angle. But the more nearly the blade of the knife is placed parallel to the groove in the staff so will it travel along it with increased facility. Mr. Dumville used to boast that in this peculiar method of turning the knife round while the point rested in the groove he had broken the point of many scalpels, but he said that by this means he had rarely failed to retain the knife in the groove when he had once fairly entered it. Having in this way divided that small portion of the urethra which is close to the cylindrical portion of the director, we can generally tell, by the ease with which the director passes on, that we have overcome the obstruction, yet very often it will be needful to turn the knife again with its cutting edge towards the rectum and slowly to drive it along the groove.

Here, again, the great advantage of a narrow-bladed straight knife, having its back and cutting edge parallel to each other,

will be apparent, for with it we can so nicely regulate the amount of tissue which we wish to divide; and holding the knife in the position described above, we can slide it along the groove and push it within the bladder, while from the narrowness of the knife-blade it cannot divide the prostate to any dangerous extent. At this stage of the operation, and as soon as the cylindrical portion of the director can be passed onwards, we can also pass the finger, if not quite into the bladder, at any rate into the dilatable prostatic portion of the urethra, and thus be quite sure that the entire passage is laid open. But there are cases in which we cannot do this, and it is difficult to explain why it should be so, except upon the supposition that the narrow portion of the director is held in the prostate. It now becomes necessary to follow some positive plan by which we may be sure that we can introduce the catheter into the bladder along the divided urethra. My method is this:—I have what I call a hollow probe, a small silver tube about six inches in length, to correspond in size with a No. 4 catheter, made at one extremity slightly bulbous, and at the other conical, so as to fit the mouth of a small india-rubber ball syringe, and provided at the time of its introduction with an ordinary silver wire stilette. I then take this hollow probe with its stilette, pass it by the perineal wound, and guide it either along the groove in the director, or by the side of it, until I believe it to be in the cavity of the bladder. But, to be quite sure of this, I remove the stilette, and if, as is generally the case, an ounce or so of urine has remained in the bladder, a small quantity of it can be forced through the hollow probe by pressure over the pubes, and this will demonstrate the true position of the instrument. If this should fail, I inject by the probe two or three ounces of warm water, and then making pressure on the pubic region, the water will flow back in a continued stream through the tube. Having thus demonstrated to the satisfaction of myself and those who are assisting me that the probe is thus placed, I direct my assistant to remove the grooved director. I then take a silver director of rather a peculiar form, being about equal to one third of a cylinder, the diameter of which would correspond to a No. 15 catheter. This is provided at one end with a small handle about a square inch in

extent, fixed to it at an angle of about 135°, and at the other end it is made perfectly smooth, but, unlike most directors, not at all spoon-shaped or lipped, being, as I have said, the section of a true cylinder. This instrument I can slide with the greatest ease by the side of the hollow probe, and pass it into the bladder without any difficulty, if in its passage it be held with its edges forwards and backwards. As soon as it has entered the bladder, and is turned round that its concavity may be directed forwards, it will dilate the wound and cause the expulsion of any remaining quantity of water or urine that may be still in the bladder. This will give another proof that the director also is within the bladder. I then remove the hollow probe, and leave the director in its place, with its concavity forwards; and now begins that stage of the operation which I think those who have many times performed this perineal section will admit is often a very troublesome one, that is, the introduction of the catheter into the bladder, where it is to be retained for forty-eight hours, or a longer period. For reasons which I will presently explain I no longer use for this purpose the ordinary elastic catheter. I employ what I have styled an urethral tube, made of the same material as the gum-elastic catheters, corresponding in size to a No. 10, ten inches in length, slightly conical at one end upon its exterior surface, and having six small holes in the first inch from that extremity. The way, or passage, through this urethral tube is perfectly straight and of equal bore throughout.

I have a wire from an ordinary gum-elastic catheter, No. 10 size, cut to such a length that when it is pushed as far through the urethral tube as the ring at one end will permit, it will project beyond it only a tenth of an inch or even less. I curve this wire in such a form as either to imitate the ordinary catheter curve, that of the prostatic curve, or the curve which is given by Sir Henry Thompson, to his No. 1 silver catheter, and I prepare to use one of these three curves, according to the requirement of the case, either by having three wires ready curved, on which I can place the urethral tube, or I curve each wire for the occasion. Having the urethral tube mounted on the wire which I have selected, the two are then in the usual way

held firmly in the right hand, and passed down the urethra until the finger introduced into the wound tells me that the tube has passed into the divided portion. I now take hold of the silver director, which has been in charge of the assistant, and with that curious harmony which we know exists in the co-ordinated movements of the two hands, there is no difficulty in slipping the end of the urethral tube into the grooved surface of the director and carrying it on into the cavity of the bladder. If any difficulty should arise it is generally caused, according to my experience, by the same fault that occasions a difficulty in the passage of the knife along the groove in the director, that is, the end of the tube strikes the groove in the director too much at a right angle; it does not lie sufficiently parallel to the surface so as to slide along it, but it sticks upon it and will not move. This difficulty may be overcome either by using the urethral tube upon a wire stilette curved to a larger circle, which is the same as being more flat, or by tilting up the handle of the director, which is just outside the wound in the perineum, so as to cause the other end of the director to dip more deeply into the bladder and form a sort of sliding surface upon which the urethral tube can run. As soon as it is evident that the tube is in the bladder, which may be proved, if necessary, by removing the wire and injecting water along the tube, pressing the pubic region and causing the water to flow out in a good stream, I then, and not till then, remove the director from the perineal wound.

Now, as to the best mode of fixing this urethral tube in the bladder. For this purpose I use a little screw catheter-holder such as is employed for holding elastic catheters, and so made that it will compress, by a screw action, a catheter of any size from 12 to 3, and with rings at the sides to which tapes can be attached. I take care to place this so far down the urethral tube that the tube may lie fairly within the cavity of the bladder. Then to keep it in the bladder, I adopt a plan for the general principle of which I am indebted to Professor Lister, who showed me while at Glasgow, many years ago, what he considered the best method for retaining a catheter in the bladder. It is this: to so arrange a system of tapes and narrow bandages around

the pelvis that the catheter shall be tied to them and to the immovable pelvis as the patient lies in bed, rather than to either thigh, or to the penis, which may be constantly disturbed in position. I take a broad bandage measuring, say, five inches in width and two yards in length; from the lower border of this I tear up a narrow strip at each end, about three quarters of an inch in width, to within four inches of the middle of the bandage. Then, to prevent this narrow strip tearing away too far, I cut with a pair of scissors a small hole in the bandage just above it, and pass the narrow strip through this, and once or twice over the edges of the bandage, thus fix it at that spot, so that it cannot slip. The bandage, thus torn, is then placed under the patient's body and tied round the abdomen just above the pelvis, uniting together the broad portions of the bandage. Then the narrow strips which hang down behind from each side of it are, it will be noticed, attached to the broad portion, at spots just eight inches apart, where they will lie on each side of the spine, under the patient. These are brought beneath the buttocks, on each side of the scrotum, and tied in the same way to the bandage through little holes in front just opposite to those behind, or, still better, a little further apart, so that the narrow bandages in front will be at least ten inches interval. All these folds of the bandage are made just comfortably tight so as not to hurt the patient, and the object of having a fixed space between the small bandages in front and behind is to prevent them, as they are so apt to do, running together in the middle line just over the line of the wound, or the position of the anus. Then from the eyelets or rings of the catheter-holder strips of tape are taken and attached to the narrow bandage which runs up on each side to such a length as shall just allow a little play to the urethral tube in the urethra.

Lastly, to obviate the difficulty which most surgeons must have observed, of retaining a flexible catheter in the bladder where it is apt to curl downwards and in this way slip out, I have, as was also suggested to me by Professor Lister, followed his plan of taking a piece of the wire stilette of a No. 10 catheter, cutting it about four or five inches long, and introducing it

into the urethral tube so as to keep that part of it stiff and straight. I convert the wire into a plug to stop the end of the urethral tube, by winding round it near to the ring a narrow piece of adhesive plaster into a conical form. This forms a plug which has to be removed each time the bladder is emptied, and it is not difficult to get a patient of ordinary intelligence to perform this operation for himself. I have lately substituted for this wire a piece of whalebone about nine inches in length, conical at one extremity, and this is to be kept in the tube in the same way as the wire, only, being pliable and elastic, it has this advantage over the wire, that it gives firmness to the whole length of the tube, whereas with the wire the tube beyond it often becomes bent and almost pierced by the point of the wire. All matters being thus arranged the patient may be pronounced in a fair position so far as accomplishment of the operation is concerned, but, as is well known, difficulties may occur long after the patient has left the operating theatre and is safe in bed. On the question of hæmorrhage I have not much to say; thus far I have had no difficulty with it, and I have only known of one case in which it has been excessive after this operation. If needful I should not hesitate to plug the wound around the urethral tube much in the same way as we do the tube in the bladder for lithotomy, but so far I have never had occasion to carry this into effect.

I have seen so much trouble and difficulty from following precisely Professor Syme's instructions to remove the catheter thus placed in the bladder after perineal section at the end of forty-eight hours, then to leave the patient to pass his urine as he can, and only introducing the catheter at intervals of two or three days: —I say, I have seen so much difficulty in this second introduction of the catheter that I have long since departed from the exact instructions of one for whose opinions in surgery I have so much respect, and I now adopt the following plan, by which it will be apparent why I use the peculiar form of urethral tube which I have already described. I leave the tube in the bladder just as I have fixed it for at least three days, or even longer if the flow of urine is free and there is every reason to be certain that the tube is rightly

placed. Then, at the end of this time, perhaps five days from day of operation, for fear the holes at the sides of the tube should become obstructed by clots of blood and mucus or phosphates, I usually proceed to change the tube for a fresh one. This I do in the following manner: I have a long stilette made of whalebone carefully fashioned in its entire length of a size equivalent to a No. 2 catheter, of a cylindrical form, quite smooth, and rounded at each end. It is twenty-two inches in length, and at a spot ten and a half inches from each end I have a mark made on it, either as a little groove carefully filed in it or still better a small white mark produced by fixing in the whalebone a fine plug of ivory. Unscrewing the holder by which the urethral tube is retained in the bladder, and cutting the small tapes which hold it, so that it can be removed entirely, but taking care that the tube is not displaced until all is ready, and standing on the right side of the patient, I hold the urethral tube firmly with the left hand. I then have the whalebone stilette well oiled, and pass it down the urethral tube, which it will be remembered is ten inches in length, till so much of the stilette has entered the tube as to bring it up to the mark, which is ten and a half inches from its end. Unless the urethral tube has become acutely bent in some part, and this can easily be done, I know that one half inch of the whalebone stilette will project beyond the end of the urethral tube, free in the bladder. With the right hand holding the whalebone stilette steadily some few inches beyond the urethral tube, and the right elbow resting firmly on the patient's right thigh, I draw, with my left hand, the urethral tube out of the urethra and slide it along the stilette until it is clearly disengaged; my right hand all the while keeping the end of the whalebone stilette still in the cavity of the bladder. Then, as soon as the other end of the urethral tube has emerged fairly from the urethra I seize the stilette close to the glans penis, and hold it there with the left hand; my assistant draws the old urethral tube away, and in its place puts a fresh tube, which should be softened with warm water to make it perfectly pliable, and well greased. This, in its turn, will slide down the whalebone guide, and the right hand once more taking hold

of the stilette, so as to be sure that it is kept steadily within the bladder.

It is easy to understand how this second tube can be slid down without any risk of its showing itself in the perineal wound or failing to reach the bladder, and on the reappearance of the little ivory mark on the whalebone stilette we know that the urethral tube has got fairly beyond the end which is in the bladder. This is then fixed in the same way by the screw catheter-holder, tapes, &c. I repeat this process as often as I deem it needful to put in a new urethral tube, and, in some cases, I have kept the tubes in for several weeks in succession, changing them every four or five days as might be required, and thus secured a perfect healing of sinuses which had been the cause of all the trouble, and this without any of those risks, in failing to introduce the instrument, which I seek by this method to avoid. In spite of all my care it has on more than one occasion happened to me that about the second or third day after the operation the patient has got the urethral tube out of the bladder. One patient, an old man, deliberately untied the tapes and thought himself very clever in performing this facile operation without instructions.

Even up to so late a period as the tenth day after the operation I have succeeded in replacing the tube in the bladder by exactly the same process as was used in the first instance, and although at this time the wound in the perineum would seem to be very nearly healed, yet the patient being under chloroform, in the lithotomy position and everything else prepared, I found no difficulty in passing through the wound, which seemed to have become merely a sinus, the hollow probe into the bladder, verifying this by a careful examination through the rectum and by the crucial test of injecting water along it, waiting for a moment, pressing over the pubes, and having it returned in a good stream through the tube. This fact being established to the satisfaction of those who assisted me I could slide by the side of the probe the silver director, which has no lip or projecting edge at its end, to prevent it passing readily, and therefore travels along the incision like a blunted scalpel,

reopens the wound, and turning it half round so as to have its concavity upwards, I could pass the urethral tube on the curved wire stilette, so as to bear upon the director and thus slide it into the bladder with the greatest ease, and from that day, in the case just referred to, as well as in other cases, no further difficulties were experienced. Whereas, on the contrary, I have known in cases of Syme's perineal section that the surgeon has been compelled at last to desist from any further attempts to pass the catheter where it has unfortunately slipped out, or had been removed, by reason of having no guide for its reintroduction which can compete in simplicity and certainty with this plan of sliding the tubes along the whalebone probe. After three or four weeks or even earlier, when the sinuses which have preceded the operation have ceased to discharge or are entirely healed, then the urethral tubes can be discontinued, and a catheter passed from time to time in the ordinary way. If the perineal section of Professer Syme be reserved for those cases, and those only, of chronic indurated urethral stricture with sinuses and with an almost impervious passage, the great advantage to be gained by the successful issue of such cases will, I think, more than compensate for the risks which it may be assumed are inseparably connected with this operation; but which, I think, may be much diminished in intensity by following out the system of operating and the details of treatment which I have ventured to particularise in the foregoing remarks.

CASES OF RESECTION OF THE HIP-JOINT, WITH REMARKS.

By H. G. RAWDON, M.D.,
SURGEON TO THE LIVERPOOL INFIRMARY FOR SICK CHILDREN.

As the operation of resection of the hip-joint for disease in childhood, is an expedient as to the desirability of which the opinion of the profession is at present divided, I bring forward ten cases in which I have performed the operation in the Liverpool Infirmary for Sick Children, hoping that they may prove of some assistance in guiding us to a conclusion as to the merits of excision of this joint.

Case 1.—William D—, æt. 4 years, was admitted December 11th, 1869, suffering from old-standing disease of the right hip-joint. The child was in a weak state, and much emaciated. He had a large excavated ulcer below the great trochanter; extreme pain was complained of on the slightest movement of the limb, while a distinct grating sound could be heard and felt in the joint. The discharge was copious and offensive.

Excision was performed January 8th, 1870, the femur being divided between the two trochanters. The head of the bone was found almost completely disintegrated. The border of the acetabulum was rough and carious, while its central portion had disappeared, the finger passing through to the pelvic fascia. From the cavity of the acetabulum was removed a loose irregularly shaped piece of necrosed bone.

After the operation the child was placed in the position to which he had been accustomed before, that is to say, lying on the sound side, with both legs drawn up.

In this case the improvement in health was almost immediate.

The wound, the greater part of which united by first intention, assumed a healthy action, all pain on movement ceased, and the child seemed to be making flesh.

On February 10th very gentle extension was employed by a light weight attached to the leg, and which in a few days brought the limb to the straight position, and the child was readily induced to lie upon his back. His convalescence was from this time uninterrupted.

On March 10th, about two months after the operation, he commenced the use of crutches, and was allowed to sit in a chair for a short time. The child was discharged April 28th, 1870, about three months and a half after the operation.

I had an opportunity of seeing the case quite recently. The child looks strong and healthy, and walks exceedingly well, without any support and with scarcely perceptible shortening, although his boots are both of the same thickness. In walking, he rotates the limb slightly outwards.

On measurement the difference in length between the two limbs was little over an inch.

Case 2.—Alice L—, æt. 11 years, was admitted April 13th, 1870, suffering from disease of the left hip-joint. She was a feeble, strumous-looking girl. A brother of her's was also afflicted with hip disease.

There was considerable deformity, while her nights were much disturbed with starting pains referred to the knee. Over the buttock, and extending on the outer aspect of the thigh, almost half way down, was a large fluctuating swelling.

As this abscess was observed to be rather rapidly increasing, it was tapped, and a quantity of thin puriform fluid, containing fragments of white curdy material, was withdrawn. The puncture readily healed, the air having been carefully excluded. In a few days, however, the abscess refilled and inflammation of the sac having come on, it gave way at the point of puncture by ulceration. The discharge became very copious, and considerable irritative fever and prostration supervened. These unfavorable symptoms continued for the next fortnight, and it was quite

evident that her constitutional powers were fast giving way, and although the condition of the patient was extremely unsatisfactory, it was hoped that excision might afford a chance of recovery.

On May 14th, 1870, I operated. The head of the femur, which was lying in a perfect well of pus, was easily turned out, and the bone divided between the two trochanters. The cartilage and part of the osseous structure had disappeared from the head, as well as from the acetabulum, both portions of the joint being rough and carious.

After the operation the limb was placed in good position by a splint reaching from the foot up to the wound, secured at the knee and ankle, and steadied by one or two light sand bags.

For the first few days the patient seemed relieved, the wound was healthy, and there was an absence of all pain; but the discharge continued very profuse. She remained in this state, just on the balance, as it were, for a fortnight, then diarrhœa and hectic fever supervened, and she sank from exhaustion on June 19th, about five weeks after the operation.

There was no post-mortem examination.

Case 3.—Margaret G—, æt. 10 years, was admitted February 21st, 1871, under the care of one of my colleagues, suffering from disease of the right hip-joint, attended with excessive discharge. She remained many months under treatment, but as operative interference was indicated, the patient was transferred to my care.

At this period she was suffering from heats and chills, profuse sweatings, and great exhaustion, her pulse being rarely under 140 per minute; while in addition to these very unfavorable symptoms, she had an ugly bed-sore over her sacrum. On the other hand her countenance was cheerful and the degree of emaciation not excessive. The pain was complained of mostly at night. The limb was in good position, extension by weight and the long splint having been persistently employed.

I excised the joint June 10th, 1871, dividing the femur immediately below the neck. The articular cartilage was entirely gone

from the head and acetabulum, which were both in a very carious condition, but little of the head remaining. After the operation a short Liston's splint was applied, with a sand-bag to steady the limb and prevent rotation. For several weeks the discharge continued to be very copious, while her pulse kept high, sometimes reaching 170.

Gradually, however, the pulse came down, as the discharge diminished, the hectic fever abated, and she slowly but steadily improved. Unfortunately, owing to the extremely critical state she was in for some time after the operation, together with the difficulty occasioned by the bed-sore, extension could not be strictly carried out, and consequently there was more shortening than would otherwise have resulted. Nevertheless, the limb promised to be a very useful one. In about two months she began little by little to use her crutches, and she was discharged October 5th, 1871, convalescing and able to go about with their aid.

The last time, about a year ago, when she presented herself, she was looking quite fat and strong, and able to bear almost her entire weight upon the limb, which was shortened to the extent of two inches.

CASE 4.—Joseph R—, æt. 7 years, was admitted March 11th, 1871. He was a delicate-looking boy, and had long been the subject of disease of the right hip-joint, which latterly had been attended with very free suppuration. As his health was perceptibly failing, under the continued and increasing discharge, resection was decided upon.

On July 8th, 1871, therefore, I excised, sawing the femur immediately below the neck. In this case, although the articular cartilage had entirely disappeared, the head was perfectly smooth and intact. From the acetabulum the cartilage was also gone, the bone being bare, but not carious.

For the first three or four weeks the boy made some little progress, the wound nearly uniting, the discharge decreasing, and the health slightly improving. Then for a few weeks he made no advance whatever, and from this time his strength began

to give way. Diarrhœa, together with chest symptoms of a tubercular character, came on, and he died on September 10th, 1871.

On post-mortem examination extensive tubercularization was found in both lungs.

Case 5.—William McG—, æt. 11 years, a delicate-looking boy, who had lost both parents, was admitted December 9th, 1871, under the care of one of my colleagues, suffering from disease of the left hip-joint. The limb had been maintained in good position, but as the constant drain upon his system by a free suppuration, which had been going on for many months, was telling seriously upon his strength, operative interference was considered advisable.

Excision was practised March 23rd, 1872, and the upper extremity of the femur divided at the usual spot. During the operation, to facilitate turning out the head, I rather forcibly flexed the knee, and in doing so felt some adhesions in or about the joint give way.

The head of the femur was exceedingly rough and carious, and the acetabulum was in a similar state. The limb was secured in a comfortable position, in the same way as in the preceding cases. Within an hour or two of the operation the boy commenced to complain of pain just above his knee-joint, and on the following day there was considerable swelling about the joint. During the following week the boy seemed to be doing well, and the hip was going on satisfactorily, but still the pain at the knee continued, though relieved from time to time by poulticing; the swelling, having materially increased, now involved the lower third of the thigh. There was distinct fluctuation, and on the twenty-third day I opened an abscess on the outer aspect of the limb, about two inches above the knee-joint, having to cut through the vastus externus before the pus was reached.

A large quantity of pus was evacuated, and the patient seemed much relieved. It was hoped that the abscess, after a few days, would close up. This, however, was not the case; the daily discharge from it continued to be considerable, while the suppuration of the hip was comparatively trifling. He lingered on in much

the same state for many weeks, his strength keeping up in a wonderful way, till within the last ten days of his life. He died on June 8th, 1872.

Amputation of the limb, the only resource left, was not permitted by his friends.

After his death I had an opportunity of examining the knee-joint, and from its state there was no doubt of the existence of old disease, and the remains of adhesions were still to be seen. The articular cartilage was partially absorbed, and just above the joint, on the anterior aspect of the femur, was a large piece of exfoliated bone, the lower extremity of which had made its way into the articulation.

Here, therefore, was abundant cause for the anchylosed condition of the knee-joint. I may observe that up to the time of the excision knee disease was not suspected; my impression, when I felt the adhesions giving way on flexing the knee, was that they were not in the joint but were due to the limb having been kept in the straight position for a long period.

Case 6.—Robert W—, æt. 8 years, was admitted July 27th, 1871, suffering from disease of the right hip-joint. He was a fair-complexioned boy, evidently of a weakly constitution, having lost both parents, presumably from consumptive disease. Notwithstanding treatment of the hip by rest, &c., a large abscess formed and opened, and as the discharge had for months continued excessive, and the patient appeared to be sinking, excision was determined upon.

On April 13th, 1872, I excised the joint. The head of the femur, which was considerably displaced, lying on the upper border of the acetabulum, was very carious; the acetabulum was similarly diseased. After the operation he made slow and not very satisfactory progress for the first six or seven weeks, then he seemed to come to a standstill, and in this state he remained for months; afterwards he improved and slowly convalesced, but with occasional periods of retrogression. He was discharged April 3rd, 1873.

The limb is an inch and three quarters short, but promises to be very useful, and he can bear his entire weight upon it. I saw him

in October, 1874; his health had much improved, though the sinuses had not all dried up.

CASE 7.—James J—, æt. 7 years, was admitted October 3rd, 1870, under the care of one of my colleagues, suffering from disease of the left hip-joint. He had been under treatment about two years when I took charge of him. The limb was in excellent position, extension by weight and the long splint having been advantageously employed. There were, however, numerous sinuses in connection with the joint, which had been discharging freely for months past, the discharge increasing rather than otherwise. The boy's general health was failing, and he was losing flesh. Excision was performed on November 16th, 1872. It was found that the head of the femur was, to a great extent, carious and disintegrated, and on the inner aspect of the neck, where it joins the shaft, there was a small cavity in the bone.

The acetabulum was rough and carious, but not to any great degree, and a moderate-sized sequestrum was removed from within it.

The patient made an excellent recovery; his convalescence was rapid and almost uninterrupted; the limb was kept in good position without difficulty. The discharge soon began steadily to diminish, and in two months he was up and learning the use of crutches. He was discharged April 3rd, 1873, in a most satisfactory state, both as regards his general health and the condition of the limb.

I have seen the boy recently; he is exceedingly well, and the limb is most useful. There is less than an inch and a half of shortening, and he walks capitally, not even requiring a high-heeled boot.

CASE 8.—Ann R—, æt. 10 years, was admitted June 7th, 1872, suffering from disease of the right hip-joint, of some months' standing, but as yet in an early stage of the disease.

The patient was a healthy looking girl, and there was no history of scrofula in her family.

For the first ten weeks or so the hip seemed to be going on

extremely satisfactorily, her strength kept up, and the treatment by rest with the long splint, together with moderate extension, had apparently answered most perfectly. Shortly after this time there were reasons to suspect that suppuration was taking place, a suspicion that soon became a certainty, as a large fluctuating swelling was observed about the hip and the upper part of the thigh; which steadily increased and ultimately threatened to point. The abscess was opened by incision, and treated antiseptically for some time, but the daily discharge, which was considerable, manifested no tendency to decrease, and after continuing some weeks the girl's health began noticeably to give way. After watching her for a few weeks longer I found the suppuration did not diminish, while her strength was being undermined, and being desirous not to delay interference further, excision was performed on April 14th, 1873.

I endeavoured in this case to follow out the subperiosteal plan recommended by Dr. Sayre, of New York. No difficulty was experienced in separating the periosteum until the trochanter major was approached, where it was found inseparable from the subjacent unossified cartilage, consequently the subperiosteal method was abandoned, and the operation concluded in the usual way.

The head of the femur and the acetabulum were more or less carious, the head particularly so at its circumference.

The day following the operation some swelling of the upper part of the thigh was observed, no doubt due to a certain amount of hæmorrhage that had occurred during the night filling up the cavity, although no blood had escaped externally.

For the next four or five days the patient was going on favorably, but inflammatory action commenced in the parts around the retained clots, followed by suppuration of the sac, which necessitated counter-openings at more than one point. This unfortunate occurrence proved a very serious drawback to the case, and, no doubt, affected its issue. Yet the patient appeared to be going on favourably for about two months, when erysipelas attacked her head and face, and just as she was convalescent the erysipelas suddenly reappeared in the hip and sinuses about it; under this second attack she sank in a few days, and died on July 16th.

Case 9.—Arthur C—, æt. 8 years, was admitted February 12th, 1873, suffering from chronic disease of the right hip-joint, in connection with which were several sinuses. There was in this case considerable shortening and deformity; movement of the limb at the pelvis was limited, the parts in the neighbourhood being exceedingly rigid. The discharge was very fetid, but not excessive. On examination bare or dead bone was readily detected with the probe.

The boy had been in much the same state for about two years, and, though able to go about on crutches, he was in a weak and unsatisfactory condition, while the disease appeared to be perfectly stationary.

I excised the hip on July 11th, 1873, and found that the head and neck of the femur had entirely disappeared, whilst from the trochanter major downwards, for at least an inch in length, it was observed that the inner surface of the femur was not only rough and bare, but also was reduced to little more than half its thickness, apparently as the result of attrition against the border of the acetabulum, which presented a corresponding bare surface.

I removed about an inch of the femur, as far as the rough portion extended.

The cavity of the acetabulum felt quite smooth and as if filled up. The rough bare portions of the femur and border of the acetabulum did not seem carious, but simply devoid of periosteal covering.

The patient made a good recovery from the operation and his health was much improved, but no arrangement for extension was successful in rectifying the shortening, all the structures about the joint being excessively rigid and unyielding. He was discharged on November 13th, 1873.

Case 10.—Mary Ellen W—, æt. 7 years, was admitted March 18th, 1874, suffering from long-standing suppurative disease of the right hip-joint. She had been for months a patient in another hospital in the town.

On admission both extremities were found rigidly drawn up, and the slightest movement of the right limb produced exquisite

pain. The discharge was profuse and fetid. The child was extremely wasted, and had the appearance of having been much neglected.

Excision was performed April 18th, 1874. The wound was not long in assuming a healthy character, and the discharge began to diminish materially. For eight or ten weeks she was apparently slowly convalescing, her general condition had improved, and the limb had been brought into good position, when rather suddenly œdema of the eyelids and face was observed, with flushing and feverishness. Albumen was found to be largely present in the urine.

The albuminuria did not yield to treatment, and from the date of its appearance she went on slowly losing ground, until she gradually sank October 10th, 1874, having become extremely emaciated, the œdema being limited to a puffiness of the face and feet.

There seems to be a possibility that the albuminuria may have had a scarlatinal origin in this case, as shortly before the œdema was noticed two cases of scarlet fever occurred in the ward the patient was in, and had to be transferred to the fever shed.

SUMMARY.—Of the ten cases it will be observed that five recovered and five died. Of these five recoveries, two (No. 1 and No. 7) were eminently successful cases, the patients being completely restored to health with useful limbs but little shortened. The third (No. 3) resulted in the restoration of the general health, but with the limb considerably shortened, though useful. The fourth (No. 6) was less fortunate, having a protracted convalescence, not yet perfected; the limb, however, is useful, but somewhat shortened. The fifth (No. 9) was successful in effecting improvement in health and bringing about in the hip that slow process of cure which nature seemed unable to complete. The shortening of the limb was scarcely lessened, but, with a special boot, it will prove a very serviceable member.

Of the five deaths, it will be observed that none were directly occasioned by the operation. Case No. 2 died five weeks after. No. 4 died nine weeks after. No. 5 died eleven weeks after.

No. 8 died twelve weeks after. No. 10 died twenty-five weeks after. The earliest, therefore, was five weeks, the latest twenty-five weeks. Of the entire ten cases, it is my firm conviction that, with one exception (No. 9), they were all inevitably doomed, as they did not appear to belong to that class (comparatively a small one) which result in natural cures.

I am much inclined to the belief that in most of these cases the operation was put off too long, and that had excision been practised earlier the result would, in several instances, have been different.

A few words respecting the operation. I am convinced of the immense value of Dr. Sayre's subperiosteal method, and purpose in my future cases adopting the principle, separating the periosteum from the bone and forcibly detaching the unossified cartilage of the trochanter major from the shaft of the femur, along with its adherent periosteum. In these cases it will be desirable to continue slight extension for a few months after the patient is able to go about.

NERVOUS AFFECTIONS IN CHILDREN.

By P. M. BRAIDWOOD, M.D.

Whether we regard the relative frequency of disorders of the nervous system in children as compared with adults, or the greater persistency among children of the effects of disease of the nervous tissues, or the imperfect pathology displayed by most works on children's diseases, we have sufficient reason for studying with increased care and patience this important class of disorders. It must be admitted that most organic diseases in children, and in particular those of the nervous system, have not yet had applied to them the more penetrating and improved methods of modern investigation and research. It is a very common opinion, held both in and out of the medical profession, that nervous diseases occasion a much larger number of deaths in childhood than any other class of diseases. Most modern writers, however, demur from such a generalisation, and agree with M. Barrier's remark, "that there is only one circumstance that in part justifies this opinion, and this is that the affections alluded to are almost always of a dangerous character, that they are beyond the resources of art, and that they furnish a very considerable relative mortality."* During the last five years I have had the opportunity of seeing very many forms of nervous disorders in children, especially in connection with the Wirral Hospital and Dispensary for Sick Children, and from this experience (as is proven by the accompanying tables) I believe that nervous diseases, especially such as may be called organic, though more

* 'A Practical Treatise on the Diseases of Children.' By Drs. Meigs and Pepper. 1870. Fourth Edition. P. 435.

frequently met with among children, are not so fatal in childhood as in after years. Though structural changes of nervous tissue are more rarely fatal in children as compared with adults, yet they are of not uncommon occurrence, and are proportionately less mortal than like diseases of other organs. But inasmuch as the symptoms preceding death in the case of children are often referable to disorder of the nervous system, and are generally so prominent as to attract marked attention, it is no matter for wonder that popular opinion should attribute so much infantile mortality to nervous diseases, or that those who compile statistics from the Registrar-General's tables should discover a comparatively high rate of mortality among children to be due to nervous disorders.

As seen in Table I of our series, post-mortem examinations rarely reveal structural alterations of nervous tissue. The following remarks, on the contrary, will show that the majority of the nervous affections of childhood are due to vascular derangement or to causes acting indirectly on the nervous system.

It is obvious, then, that nervous diseases should be examined in relation to the tissue changes they present, the injured organs implicated, and the functional derangements they exhibit. But, when studying disorders of the nervous system among children, certain other factors deserve weight. The imperfectly developed tissues and organs of children exhibit a very different series of morbid alterations from those which are met with in fully formed tissues or in those undergoing retrogressive metamorphoses. It is to be noted also that in childhood there is a relative preponderance (even in viscera so essential to life as the brain and spinal cord) of those tissues which, like the connective tissues, are regarded, not as functionally useful, but rather as forming padding, and which readily become centres of morbific processes. Further, it must be remembered that certain diseases incidental to this period of life, as also certain physiological processes which occur in childhood, exert a very important influence on the nervous pathology of children.

Bearing these facts in mind, it will be best to group the nervous affections incident to childhood into three classes.

1st. Such as are due to disease of the membranes which cover the cerebro-spinal organs.

2nd. Such as are traceable to reflex causes (diseases or derangements of other viscera, of the blood &c.).

3rd. Such as have their origin in structural lesions of the nervous tissue, comprising the brain and spinal cord or their branches.

I. *Diseases of the membranes covering the brain and spinal cord.*

Modern pathology leads us to include under one comprehensive symptomatology various forms of this class of diseases which hitherto have been named and classified rather in accordance with symptoms or a supposed etiology than with reference to their true pathology. The medical practitioner's insatiable desire to learn what may enable him to overcome disease or to relieve suffering will not be forgotten, though the aim of these remarks is rather to stimulate the thoughtful reader to draw his own practical conclusions than to propose specific modes of treatment.

The membranes of the brain and spinal cord are very liable to congestion, either in consequence of their frequent subjection to external disturbing causes, as blows and falls, or to the greater distensibility of their blood-vessels. But in childhood the power of overcoming these temporary congestions and their results is so great that death from meningeal congestion or its sequelæ is comparatively rarely met with. Rilliet and Barthez, for example, "report 33 cases of tubercular meningitis against somewhat over 245 of pneumonia, 174 of bronchitis, 111 of typhoid fever, 167 of measles, and 87 of scarlet fever."* The same authors, moreover, state that tubercular meningitis most commonly occurs between two and seven years of age, and that it attacks boys probably more frequently than girls. Simple acute meningitis and simple dropsical effusion into the cranium (among

* Meigs and Pepper, ibid., p. 437.

the membranes or into the ventricular cavities), without inflammation, which were formerly included under the term acute hydrocephalus along with tubercular meningitis, are very rarely indeed met with. We agree, therefore, with Drs. Meigs and Pepper in considering that the term acute hydrocephalus should be restricted "to the single condition of sudden effusion in or around the brain, independent of any inflammation; a condition which only occurs in connection with the causes of general dropsy, and especially with renal disease, and is, indeed, merely the most rare form of internal dropsy, and, as such, not to be regarded as a separate disease." True tubercular meningitis, or, as we prefer to term it, *adynamic meningitis*, occurs generally in children of tubercular or scrofulous parentage, and among such it is not uncommon for several children of the same family to be cut off by it. But while tubercular meningitis is often traceable to this constitutional predisposition, many instances ought to be ascribed to improper or imperfect nutrition during infancy. Hence it frequently happens that blows or falls on the head, violent moral emotions, and exposure to the sun, induce meningitis, which in a sickly or poorly nourished child develops an adynamic inflammation characterised by imperfect lymph thrown out on the pia mater. While, then, in children of scrofulous or tubercular parentage we meet with meningeal congestion induced by a fall, or pulmonary congestion succeeding exposure to cold, leading to the formation of imperfect lymph and forming the diseases termed tubercular meningitis and scrofulous pneumonia or phthisis; in children of healthy parentage, but imperfectly or improperly nourished during infancy, we find like congestions terminating also in adynamic inflammations.

The anatomical elements which characterise tubercular meningitis are minute, more or less opaque, greyish-white granulations or pellets of lymph, rounded or flattened, "varying in size from two fifths to four fifths of a line," scattered over the pia mater, especially over the base of the cerebrum and upper surface of the cerebellum, and invariably following the tracks of the blood-vessels, surrounding them and dipping with them between the convolutions. Around the circle of Willis they are generally most abundant.

On microscopical examination these lymph-pellets are seen to be "composed of numerous oval cells with a single nucleus, though there are also some larger cells mixed with these which contain several nuclei." In many instances, as has been observed by Cornil, Hayem, Bastian, myself, and others, the tuberculous granulations will be seen to envelope a small arteriole, and obstruct its calibre at this point. "There is also marked proliferation of the cells of the perivascular sheath of the vessel for a varying distance on either side of the granulation." * The natural history of the process appears to be the following, and will be illustrated by the post-mortem examinations of cases to be cited hereafter.

An exciting cause, considered at the time to be too trivial to attract notice (as a fall from a chair), induces congestion of the cerebral meningeal vessels. This is aggravated by crying, by disorder of digestion, or by some similar influence, which tends to keep up the flow of blood to the cranium. Effusion of serum, and transudation or migration of leucocytes follows, and the naturally impaired constitution of the child shows itself by the formation of imperfect lymph, the subsequent blocking up of the vessels, and by anæmia of the brain from a greater or less arrest of the circulation through the circle of Willis. The venous congestion generally found accompanying meningitis is explainable by this mode also; in fact, it is the sequela to be naturally expected to follow the process we have described. In the more external arachnoid and among the intervening serous fluid various alterations are observable. The subarachnoid fluid is turbid in the vicinity of the inflammatory process, while the arachnoid membrane itself appears congested, sometimes thickened, and opaque. In one remarkable instance I met with some years ago the upper surface of both cerebral hemispheres was covered with a layer of lymph a quarter of an inch or more in thickness. Occasionally these several membranes of the brain are together implicated, and include also the dura mater in the inflammatory process. But it is to be noticed that while tubercular or adynamic meningitis is most frequently confined to the base of the brain, acute simple meningitis implicates generally the cerebral convexity. A further

* Meigs and Pepper, ibid., p. 438.

sequence of this pathological process is effusion of serum into the lateral ventricles, but the amount of this effusion varies greatly. Sometimes there are only a few drops or a teaspoonful, while in other instances it amounts to several ounces.

The further pathological alterations met with are such as might be expected to follow a diminished blood supply to and compression of the brain substance from its centre outwards. The whole organ seems to be enlarged, the convolutions become more or less obliterated, in most instances congestion of the brain substance itself is discernible, and in nearly all marked cases the ventricular lining membrane presents a granular appearance. "Tubercle of the brain itself may be occasionally met with," remark Drs. Meigs and Pepper (p. 441), "having no connection with the meninges, and varying generally in size between that of a millet-seed and hazel-nut, but reaching sometimes the volume of a pigeon's or hen's egg, or even that of half the fist." In a large proportion of instances of so-called tubercular meningitis minute deposits or tubercles are found in other organs, and by many pathologists such deposits are regarded as a necessary accompaniment or evidence of the tubercular character of the meningitis. That minute abscesses containing caseous or liquid pus or lymph should be met with in such a slowly progressing form of disease as chronic meningitis is not to be wondered at, and is referable to a mechanical cause like embolism rather than to a constitutional cachexy. All wasting diseases, especially in children, evince a tendency to secondary abscess formation without attempt at resolution; and the situation of such secondary abscesses may be in vascular, yielding viscera, as the lungs and liver, or in less vascular organs, as the skin and fibrous tissues, but there appears to be no determinate law regulating the location of such abscesses. Whether, then, the exciting cause be a fall leading to congestion of the cerebral or of the spinal membranes and sequent adynamic inflammation of the coverings of the brain or spinal cord, or whether the fall produces dislocation or fracture followed by adynamic local inflammations, if minute secondary deposits or tubercles are discovered after death these are to be regarded as indicative of the adynamic state of the patient's health when the

injury was received, rather than as the sign of an inborn tendency to a special disease (tubercle). In illustration of these remarks I shall select four cases coming under my observation which well exemplify the principal features of this treacherous disease, meningitis.

About six months before her fatal illness commenced E. W—, æt. 5¾ years, complained occasionally of headache, and her appetite became impaired. She was naturally a precocious child, and when she said that the letters danced before her eyes while reading, her guardian thought she wished to be excused from her lessons. Change into the country improved her general health till about three months before her last illness, when she suffered severely from what her medical attendant termed mumps. This was followed by frequent bleedings from the nose. Her customary mid-day sleep she had either given up or she slept badly when she attempted it during the day. Squinting followed; she complained of being easily fatigued, and used to throw herself down on the sofa frequently, crying with pain in the head. These symptoms did not receive much consideration till she began to scream at intervals from pain in the head, showed pallor alternated by flushing, had occasional twitchings of the upper extremities and face, and constipation. Grinding of the teeth and a variable appetite led also to a surmise of the presence of worms.

The most marked and distressing symptom in this patient was intense pain in the head, passing from the forehead through to the occiput, and compared to a hammer striking on the vertex of the skull. It caused her to utter piercing screams, though naturally of a patient disposition, and it was relieved only by firm pressure with the hands applied to the forehead and occiput. Her pulse varied during her last illness from 116 to 140; her temperature was 99° to 103·4°. Occasional vomiting ushered in her illness; this was followed by constipation, twitching of the upper limbs during sleep, suffused eyeballs, with intolerance of light. Consciousness, however, remained unaffected to the last. This last illness was of one week's duration.

A post-mortem examination could not be obtained, but the

nature of the malady was in this instance only too plainly depicted by the symptoms exhibited during life. The case illustrates well the insidious nature of meningitis at its onset, and the inefficacy, in the majority of instances, of all known remedies to overcome this disease.

An instructive instance of recovery from meningitis came under my notice about four years ago.

Mrs. E—, when five months pregnant, sent for me because of pain in the right iliac region. Her symptoms gradually developed into the formation of a large perityphlitic abscess, which pointed posteriorly. This abscess I repeatedly punctured with a trocar; her delivery was followed by pyæmia, and then I opened the abscess freely. She gave birth to a son at the full time, but was confined to bed for four months subsequently. The child, when born, was small and very emaciated, and was reared "on the bottle." When six weeks old this infant began to show cerebral symptoms, throwing back his head and burrowing it in the pillow, starting suddenly from sleep and screaming; he had also diarrhœa, pyrexia in the evening, and constant vomiting. A few weeks later both his ears commenced to discharge pus, and the small bones of his left and afterwards of his right ear necrosed and were expelled. About this date also he was much troubled with a short dry cough, and he suffered severely from ophthalmia. When seven months old he became much worse; his head was of a very large size, and during several days he was very prostrate, scarcely moving, and took no food. His abdomen was much swollen and tense. During this illness he was rubbed all over with cod-liver oil, he received the compound syrup of the phosphates (Parrish), and his ears were syringed with tepid water containing carbolic acid. The fœtor of the purulent discharge from his ears was scarcely bearable, and during many months it continued to be very offensive. At this stage of his illness croton oil liniment was applied over different portions of the infant's head daily for four to six weeks, and some weeks later he was blistered behind the ears and iodine ointment applied all over his abdomen. The child began to improve when about twelve months old, but till then his life hung in the balance. He now

could take cod-liver oil internally, and gained flesh rapidly. He cut his first teeth when sixteen months old, and commenced to walk when two and a half years old. Now, when nearly four years old, he is an active, strong boy, running about like other children. His head does not now look out of proportion to his body, and the bones of the cranium are well ossified. He hears very imperfectly and his ears continue to discharge. He sees perfectly, but has strabismus still. He understands pretty well, but cannot speak, though he attempts to articulate. The mother of this child has two perfectly healthy children younger than this boy.

This case is interesting because of the meningeal attack being distinctly traceable to the improper nourishment supplied to the infant in utero by the diseased mother, and because of the child's recovery being due mainly to nature's instrumentality. No one who has experience of meningitic cases will deny, I think, that the spontaneous diarrhœa of infancy and the free suppuration through the ears were the principal means of relieving the meningeal congestion and effusion which carry to a fatal termination most of the sufferers from meningitis.

In the following two instances the diagnosis made during life was confirmed by post-mortem examination.

F. M. W—, æt. 14 months, is said to have fallen out of bed, but to have presented no symptoms for two weeks thereafter. She is said to have taken ill seven days before death, and during this time she was convulsed at short intervals and was only slightly conscious. Her mother belongs to a phthisical family. The cranial sutures were well ossified. On opening the cranium the dura mater was found to be very adherent over the longitudinal sinus. The meningeal vessels were full of blood, the brain substance congested and softened. A considerable amount of serum was found in the lateral ventricles and at the base of the skull. The arachnoid and pia mater all over the base of the cerebrum and adjoining surface of the cerebellum looked very milky, while here and there were to be seen whitish specks of scrofulous deposit traceable along the blood-vessels. These minute patches of lymph were especially distinct on the upper

surface of the cerebellum and in the immediate neighbourhood of the circle of Willis.

Again, A. H—, æt. 1¾ year, about eighteen days before her last illness set in had a fall from a chair on her left side. When only a fortnight old she was attacked with hooping-cough, from which her brothers and sisters were suffering. The attack in her case was most severe, and she retained the characteristic cough for six months. Her parents are strong healthy people, though her relatives on the father's side are said to be subject to "fits." For three months prior to this illness her cervical glands had been enlarged. Two days after her fall my advice was asked, as the child was cross and could not hold up her head. On the following day she became unconscious and would not take food. During this, her mortal illness, she exhibited occasional convulsive movements of the extremities, squinted, kept her teeth firmly clenched, but had no cough. Her face was flushed; she sobbed, sighed, and moaned, but was conscious at intervals except during the last three days of her life. Her head at times felt extremely hot to the touch. The pulse all through her illness was very rapid and intermittent. The temperature in the axilla was 103° F. two days before death, and 105° F. on the day preceding death. When the cranium was opened the vessels of the dura mater were found congested. The brain substance was firm and looked healthy. The arachnoid appeared muddy, and at the base there was an increase of serum. Over the upper surface of the cerebellum, as well as over the adjacent surfaces of the medulla and cerebral lobes, patches of lymph varying in size were found scattered, and the characteristic minute specks of tubercular deposit were seen lying in the vicinity of the blood-vessels, especially those composing the circle of Willis.

In these two cases also all the ordinary remedial measures were employed. But neither counter-irritation applied in the neighbourhood of the base of the brain, sedatives to control the circulation and thus diminish the effusion of lymph, absorbents as iodide of potassium, or any other means, were of avail. Purgation even with mercury was not in itself sufficient to arrest the

progress of these serious pathological lesions, and the lesson taught by the recovery of the former patient with nature to aid the cure proved in this instance of value by showing that no means has yet been discovered whereby we can control inflammatory processes affecting the cranial base. Before leaving this first branch of our subject, the nervous affections of children, it will be well to summarise the most important symptoms presented by those suffering from meningeal inflammation, to refer to the prognosis in such cases, and to indicate the best modes of treatment.

The incubative, prodromic, or initiative stage of meningitis is certainly the most important as regards the use of means likely to induce recovery, but it is marked by symptoms so obscure that for the most part it is overlooked. An apparently trivial exciting cause is in these instances followed after an interval of fifteen days to three weeks, as in the cases above cited, by symptoms plainly indicative of meningeal congestion and inflammation. This apparently slight accident, as a fall, blow, or violent emotion, may induce headache, vomiting, and constipation or an irregular action of the bowels, but these symptoms are not generally persistent. The child recovers more or less completely from the effects of the disturbing cause, though more frequently it continues to exhibit signs of impaired health. Its appetite becomes bad and capricious; constipation and diarrhœa alternate; it is pale and gradually emaciates; it is listless and apathetic at intervals; complains of feeling weak and tired; it is irritable and peevish; study and exercise are alike distasteful; it is often restless by night, and it is not unfrequently troubled with a short dry cough. But none of these symptoms are pathognomonic, and are ascribed to intestinal irritation from indigestion, or, as in the case first narrated, the symptoms are supposed to be caused by worms. When, however, the pathological condition is fully established, or, more correctly speaking, when a further stage of the pathological process is induced, the three important symptoms, headache, vomiting, and constipation, become persistent and attract attention. By older children pain in the head is complained of, but in infants this is indicated by

rolling about of the head, by burrowing of the occiput in the pillow, or by rubbing the head with their hands. This symptom is generally accompanied by a sharp, shrill cry, called by Coindet the hydrencephalic cry. This cephalic pain is not persistent, but recurs at intervals, and, as might be expected, it is aggravated by any cause likely to increase the circulation through the brain, as raising of the child out of bed, intestinal disturbance, or a sudden start. Vomiting is almost a constant symptom, but persists generally only during the earlier two or three days of the illness. Constipation is also frequently observed during the first few days, but it is, I think, more probably caused than causative. It is generally followed by diarrhœa, and hence I believe the constipated stage to be induced by the meningeal congestion, while its sequence, diarrhœa, results from the flaccidity of the intestines caused by removal of the central congestion, just as on irritation of a nervous centre we produce contraction of the peripheric vessels, and the subsidence of such irritation is followed by relaxation of these vessels.

As the attack proceeds the child becomes dull and sad, or excited and irritable; its sleep is disturbed, and it is restless; it grinds the teeth, and at intervals, both when awake and during sleep (but most commonly while dozing), it utters a sudden, sharp, peculiarly shrill cry. As might be expected, the special senses exhibit an exaggerated action; the child shuns the light or closes the eyelids firmly and contracts the brows, while its hearing becomes painfully acute, so that it becomes irritated by the slightest sound. Often the general sensibility also becomes exaggerated, but the intellectual faculties remain undisturbed. There is exhibited very frequently at this stage of meningitis a certain expression of the countenance, a peculiar look, which to those who see many such cases becomes very characteristic of the nature of the malady. This symptom is described by Drs. Meigs and Pepper as, "in fact, a fixed or staring look, like that of one in a mild ecstasy." To me it suggests apprehension and suffering without being able to describe the feeling or refer it to any one part, while in infants the expression of countenance is that of indifference. This symptom, however, deserves more attention

than it generally receives and is of great practical value. Most children, moreover, when suffering from meningitis are observed to sob or sigh at intervals, and others are much troubled with hiccough. If these symptoms persist they become very characteristic of the nature of the disease. As might be expected, in this prodromic stage of meningitis the pulse is accelerated, and, as pointed out by Dr. Whytt, of Edinburgh, in 1768, it may rise to 120, 130, or even 140, while it is, "as a general rule, neither full nor tense, but rather soft and compressible." The ophthalmoscopic characters presented by meningitis, though probably not required *per se* for diagnosis, may with advantage be here described. The ophthalmoscope, in fact, I have found of value in meningitis only when the disease is so slowly progressive as to be indicated very doubtfully by symptoms. In meningitis "the obstruction to the return of venous blood through the sinuses produces in both eyes, but especially in the one corresponding to the hemisphere where the inflammation is most intense, congestion and œdema of the optic papilla and surrounding tissue (Bouchut's peripapillary congestion), tortuosities and varicosities of the retinal veins, and occasionally thrombosis or rupture of these vessels, causing minute hæmorrhages in the retina. In some cases the size of the globe is increased, owing to hydrophthalmia. These lesions," remark Drs. Meigs and Pepper, "are, indeed, more frequent in tubercular than in simple meningitis, since the inflammation and resulting exudation are more apt here to involve the base of the brain, and cause a greater degree of obstruction to the circulation."*

The second stage of a meningitic attack is characterised by nervous symptoms; the intermittent peripheric irritation of the first stage of the disease caused by an intermittent meningeal congestion gives place now to persistent nervous symptoms produced by a continuous congested state of the cerebral meninges. The headache, spasmodic shrieking, and occasional convulsive twitchings of the extremities, observed in the first stage of meningitis, are succeeded in the second stage of the disease by continuous muttering delirium, by an expression of wildness, and by

* Drs. Meigs and Pepper, ibid., p. 445.

somnolence from which the patient can at first be roused, but which soon passes into coma. The general sensibility is diminished, but often the special senses continue to be abnormally excited. Pallor and flushing still are observed to alternate, but the congestive state passes off much more gradually now than formerly. This stage is further characterised by the symptom to which M. Trousseau has given the name of "tache méningitique" or "tache cérébrale," and which is practically of much value. The slightest pressure with the finger on the skin, especially of the face or forehead, causes a red or pink spot, which, at first faint, becomes more intense in colour, remains for a few moments, and gradually fades away. This characteristic appearance on the skin is produced by slight pressure, and so also congestion of the face is induced by any slight exertion, as in moving or in taking food, and the discoloration in both instances passes off very gradually. Occasionally convulsive twitchings of the face are observed to break the monotony of the somnolent stage of the disease. The eyelids are kept partially closed, and beneath them the eyeballs can be observed rolling about automatically. The pulse falls sometimes even to the normal standard or lower, but it becomes also irregular in force and frequency.

This second stage passes, generally two or three days before death, into that characterised by decubitus and coma. As might be inferred from the pathology of tubercular meningitis, the decubitus is generally confined to one side, and gradually involves the other side, just as the convulsions of the limbs are generally found to affect either side alternately. The leg is flexed on the thigh, and the thigh on the abdomen, while the elbow is also flexed and the arm fixed firmly to the side. The pulse and temperature, as a rule, begin to rise about the third day before death; but occasionally the thermometer indicates a fall, even as low as 79·4° (Reynolds's 'System of Medicine,' vol. ii, p. 379). The comatose stage is very lingering, and, in this respect, characteristic of meningitis.

From these remarks it might be inferred that meningitis always assumed the adynamic or tubercular form; and, indeed, what may be termed idiopathic meningitis may be regarded as always

running a chronic course, while acute simple meningitis, not produced by injury, is an extremely rare disease. Simple acute meningitis is, however, distinguished from the adynamic form by running a rapid course, by presenting the symptoms of acute inflammation, as frequent convulsions, acute headache, excessive restlessness, and violent delirium; by showing no intervals of complete cessation in the symptoms and apparent recovery, and by attacking the most robust while in blooming health. In its pathology, too, acute meningitis differs from tubercular meningitis. Acute meningitis is characterised often by simple vascular congestion and serous effusion, but when lymph is formed this covers a more extensive and continuous surface than in tubercular meningitis, and is found to occupy generally the convexity of the cerebrum.

As regards the *prognosis* in meningitis, when the symptoms are markedly characteristic of either the acute or the chronic form of the disease, we should, I think, hope for but not expect recovery. Cases presenting all the earlier symptoms of tubercular meningitis, and even isolated examples of this disease in its second stage, have been known to recover; therefore there is reason for hope. But, seeing that post-mortem examinations most generally disclose in such cases tubercular infiltration of other viscera besides the cerebral meninges, and as the lymph deposit probably *precedes* the other pathological lesions, and accordingly renders them more dangerous to life, there is not much ground for expecting recovery. The cerebral meningeal vessels have their resiliency interfered with by lymph adhesions and their calibre encroached upon by multiplying lymph-cells; hence they cannot relieve themselves, and like the atheromatous vessels of advanced years remain in a chronic state of full-bloodedness.

Lastly, as regards treatment. In this also we are guided by pathology. To be of use remedial measures require to be applied early, promptly, and efficiently. If the chronic congested state cannot be removed, it can, at all events, be modified. Rest, accordingly, is the primary indication, and this is procured both by position and by the use of means which control the general circulation. Physical rest and quiet, sedative medicines, and

even occasionally an early employment of leeches to the back of the ears, will diminish the flow of blood to the cranium. Again, counter-irritation by purgation with minute doses of calomel, by the occasional employment of croton oil to various portions of the vertex, and by hot baths, are of eminent use; but in the use of counter-irritants I am inclined to think the error generally made results from a *nimia diligentia*. I blame myself, and I believe those who reflect on their treatment of such cases will find frequent occasion of self-blame, in the too active use of counter-irritants, especially of croton oil. Extreme quiet of body and of the nervous system, counter-irritants (especially sinapisms to the nape of the neck and behind the ears), and very nutritious, simple diet, in which the food is given frequently and in small quantities, cold applications to the head, especially when very hot, and gentle purgation, will, I believe, be found most efficient in relieving symptoms and aiding recovery. Iodide of potassium is generally recommended, but in my experience it is only of use if the disease can be considered as arrested, while cod oil and steel prove useful adjuvants in restoring health.

II. *Nervous diseases traceable to reflex causes.*

Under this head are included very many forms of nervous affection, and their characters as a class will be indicated by the examination of a few of them individually, and will be illustrated by cases I have recently seen.

As shown in the accompanying table of certified causes of death, among the 68 instances in which the certificate refers death to cerebro-spinal lesions, 12 were stated to be deaths from convulsions and enteritis, 4 meningitis and enteritis, 11 convulsions and pertussis, and 8 simply convulsions. Hence more than one half of the total certified causes of death among children indicated a morbid alteration in the cerebral membranes, excited by peripheral irritation, and the major half of these deaths occurred from convulsions excited by intestinal disease.

Moreover, of the whole number (68), in only 6 instances was the disease localised within the cranial cavity, and in only one case was the spinal cord alone affected.

Daily experience, then, requires us to recognise as *the* most frequent cause of nervous affections in children some peripheral irritant, either disease of an organ or some blood disease. Such irritants, too, induce disorder of the membranes only of the cerebro-spinal system, especially of the cranial membranes; and very rarely does the meningeal congestion or the meningeal inflammation induce what might be termed a sympathetic or simultaneous congestion or inflammation in the nervous tissue proper.

On this account it is to be observed that nervous diseases in childhood differ from like affections in adult life or in old age in two particulars—the abnormal pathological process existing principally in the cerebro-spinal membranes; the symptoms exhibited are those of active movements, rapid muscular contractions and relaxations—in other words, convulsions; and, secondly, as is learnt from Table 1 accompanying this paper, post-mortem examination very rarely indeed enables us to detect either by the naked eye or microscopically any alteration of the nervous tissue. Here, then, a marked and important contrast is found distinguishing the nervous affections which may occur during the years of growth from those met with during the period of retrogressive metamorphoses. In youth the cerebro-spinal membranes are generally alone implicated, and the symptoms exhibited are convulsive; after adult age has been reached, and during old age, the nervous tissue becomes readily diseased by itself, or in connection with its enveloping membranes, while loss of power or paralysis is the symptomatic form most commonly seen.

The most commonly met with member of this second class of nervous affections in children, and withal a rare but truly an occasional cause of death, is that type of convulsions (popularly termed "inward fits") arising from intestinal irritation. An infant receives some food which it is unable to digest, or a change in the weather induces cold feet in the infant or acts in such other way as to excite

intestinal congestion with its natural sequence, flatulent distension. From the imperfectly developed muscularity of the intestines in childhood this distension is not readily overcome and the flatus expelled, while, if overlooked, in a few days it becomes so excessive as to press upwards the diaphragm and affect the performance of their functions by the thoracic viscera. But irritation of the intestinal cavity followed by convulsions may be explained in another way, and this probably is the *modus operandi* in instances where the cerebral symptoms succeed shortly the intestinal disorder. In cases where engorgement of the blood-vessels of the intestines is induced rapidly by the application of an excitant to the intestinal mucous membrane, as when indigestible food is taken, or vermes are present, an alteration in the circulation, implicating of necessity secondarily the cerebral vessels, may be regarded as a sufficient explanation of the convulsive attacks exhibited by such children. Or, perhaps, the sympathetic ganglia in the abdomen are the means of conveying the impress of the irritation from the intestines to the heart; and this appears to be the more probable course pursued, for on post-mortem examination Peyer's patches are generally the only portions of the intestines found diseased. Convulsions induced by intestinal irritation or by intestinal disease present many modifications which are really differences only in degree. The following case is a good illustration of these remarks.

H. L—, æt. 15 months, was brought to me about the middle of August, suffering from diarrhœa; she improved, but had relapses and again recovered, and thus the case progressed for two months. She had not been weaned, and received farinaceous food, weak tea, &c., as well as her mother's milk. She became gradually more and more emaciated, but the wasting was at death far from extreme. She was brought for medical advice at intervals of three weeks. During the last fortnight of her life she was troubled with a short dry cough. The first convulsion occurred at 2 a.m. of the sixth day before her death. Twenty-four hours later she had another fit; she had two on each of the two succeeding days, and five on the day previous to her death. During these days she was not purged. When seen on the day before her

death her respiration was hurried and laboured, her pulse not very rapid, but irregular; she was unconscious, but did not squint. During a convulsive attack she had contractions of the muscles of the face and of the limbs on alternate sides; she squinted and closed the jaws firmly only during the paroxysm. On post-mortem examination, twenty-nine hours after death, the cerebral meningeal vessels (especially the veins) were observed to be congested, and there was slight excess of ventricular fluid, while the brain-substance was healthy. In the thorax no indications of disease were found. The small intestines were seen congested at intervals, and several of Peyer's patches presented beautifully the granular appearance so well seen in "granular eyelids." There was catarrh of the large intestine, but no other signs of disease. This form of nervous affection, then, is indeed a sequence of peripheral irritation rather than a primary disease. The original and true ailment is overlooked till the symptomatical secondary stage attracts attention. In many instances, however, the nervous disorder succeeds the primary lesion so rapidly as entirely to conceal the *origo mali*, and the fit is treated medicinally while the piece of raw apple injudiciously given by the parent is never thought of. It is important, therefore, that medical men should refer most convulsive attacks in children to intestinal derangement, or some other peripheral irritation, as thereby they would rarely indeed fall into an error.

The symptomatology of such cases is sufficiently simple. A child becomes feverish, and is observed to be so generally towards bedtime only, while during the remainder of the day it may apparently be in good health. It is restless in the night, tossing about, throwing off the bedclothes, grinding its teeth, crying, speaking, moaning, or starting in its sleep, and sometimes twitching slightly the muscles of the face. In a few days it becomes fretful and irritable, disturbed by slight external excitants, wakened by the slightest noise, and, if an infant, vomits its food at intervals. Vomiting rarely occurs among children over two years old, except at the onset of a fever or at the commencement of some cerebral disorder. The pulse may be normal or somewhat accelerated, and in infancy the throbbing

of the anterior fontanelle is a symptom deserving of notice. The bowels act irregularly, but diarrhœa generally prevails, while the colour of the motions is greenish or whitish, and their odour very offensive. The abdomen is distended, the thighs flexed on the abdomen. Even at this stage there may be cerebral disorder without any more patent sign. In infants especially the important premonitory signs, as crying, vomiting, distension of the abdomen, and flexure upwards of the lower limbs, are overlooked or are interpreted incorrectly until the child is observed to become rigid, clench its hands, firmly close its mouth, roll about the eyeballs, and become pallid with a blue discoloration around the mouth and lower eyelids and along the alæ nasi. It is then pronounced to be "convulsed inwardly," and if the abdomen is examined it will be found generally to be much distended with flatus and the lower extremities to be cold. These fits commonly last only a few minutes, and the child remains thereafter for some time in a partially conscious state.

In older children, however, the cerebral disorder sets in more gradually, and is indicated by a distinct series of symptoms. The child becomes drowsy, indifferent to surrounding objects, or complains of pain in the head. Vomiting ceases during this second stage, and constipation succeeds the diarrhœa. The pulse becomes weak, irregular, or intermittent. The child becomes convulsed at first, generally at regular intervals, but by-and-by the convulsive attacks succeed each other more and more rapidly, and the child may die in one of these, as did H. L—, whose case has been narrated above, or it may become comatose and gradually sink.

The proper *treatment* to be pursued is sufficiently evident; the real difficulty consists in the diagnosis. Intestinal irritation from improper food should be corrected by some mild aperient; intestinal disorder from acidity or any like cause requires the exhibition of alkaline and other soothing remedies (*not opiates*); while a proper diet and attention to keeping the body very warm are important, though often too slightly esteemed, aids to recovery. To shorten the convulsive attack and to relieve the irritability it has excited a hot bath will be found most serviceable, while cold

applied to the head thereafter is felt by the child to be very soothing. But occasionally, even after the exciting cause of the convulsions has been removed, the child continues to have fits or exhibits nervous irritability in some milder form. In these instances sedatives are required, and the best are belladonna, succus conii, gelseminum, bromide of potassium, and chloral, especially the first two combined. The most troublesome variety of these convulsive attacks is that occasionally met with where children under two months old become convulsed, as the mother says, "without any cause." Sometimes on being carefully cross-questioned the mother will plead guilty to having given the infant, at intervals, spoon-meat, and the attack is naturally attributed to this. But in the instances I now refer to no spoon-meat has been used, or if it has been used its administration has been stopped, yet the fits continue to recur. When such is the case the cause seems to be the mother's milk. The mother looks healthy, she is careful with her diet, the supply is abundant, the quality of the milk, as far as can be judged by simple tests, is good, yet it does not agree with the child. In such cases the infant generally vomits more or less of the milk, but the portion that remains appears to be the source of irritation, for it is generally some time after being nursed that the child becomes convulsed. These cases are very obscure, but it is well to bear in mind the possibility of the mother's milk not agreeing with the infant and to forbid nursing when convulsions continue to recur after every conceivable source of intestinal irritation has been removed. That spoon-meat feeding is the most common cause of convulsions among children in England is shown in a remarkable way by the following remark of the Registrar of Births and Deaths in Scotland:

"Even the customs or habits of the peoples of each of the countries are reflected in the deaths. Thus, the English people are in the habit of stuffing their babies with spoon-meat almost from birth, while the Scotch, excepting in cases where the mother is delicate or the child is out nursing, wisely give nothing excepting the mother's milk till the child begins to cut its teeth. The English practice occasioned the death by convulsions of 23,198

children under one year of age during the year 1868 out of 786,858 births; in other words, caused one death from convulsions in every 34 of the children born during the year in England. In Scotland during the same year only 312 infants under one year of age fell victims to convulsions out of 115,514 children born during the year; in other words, one death from convulsions in every 370 born during the year. What a saving of infantile life would occur were the English to adopt the rational Scotch system!"

The second largest class of nervous affections in children traceable to reflex causes are those produced by blood-poisoning. The best example of these is presented by convulsions ushering in one of the exanthemata, and the most frequent and most fatal form of exanthem commencing thus is scarlatina. On this point Drs. Meigs and Pepper remark, "We may conclude, therefore, that convulsive symptoms appearing early in scarlet fever indicate a highly dangerous and, in all probability, a fatal attack, while severe and especially prolonged delirium or coma are also extremely unfavorable symptoms, but somewhat less so than are those of a convulsive character." My own experience is that convulsions ushering in scarlet fever are almost always fatal, while a convulsive attack occurring immediately after the rash is developed or occurring simultaneously with a profuse cutaneous eruption is a serious but not so fatal symptom. It is further worthy of note that this form of attack characterises certain epidemics, as that prevailing at present, while at other times it is very seldom observed. Convulsions ushering in scarlet fever are, however, in my experience, much more fatal than are uræmic convulsions induced by scarlatinal nephritis. To instance now some cases which have come under my notice.

L. W—, æt. 6 years, died on November 6th, 1872, with the following history of her illness. On the day preceding her death she was out playing as usual and appeared to be in robust health. Towards bedtime she was observed to cling to the fireside and her face was flushed, but she did not complain. She is said to have slept well and to have wakened as usual. Half an hour later, about

6 a.m., she had a convulsion; about 6.30 a.m. I was summoned and recommended a hot bath. She appeared to be soothed by the bath and was apparently better, but "was never quite out of the fits." At 9 a.m. I found her looking livid, the muscles of the body firmly contracted; the left side of the face and corresponding upper extremity twitching, but the rest of the body still. I gave her chloroform, which subdued the rigidity, but the convulsions returned when she recovered from the anæsthetic state. Another hot bath was administered, but this did not produce perspiration; a livid rash was observed obscurely shining through the skin. She died a few hours later.

T. B—, æt. 3½ years, was in excellent health and spirits till 11 a.m. of October 20th, 1874, when he complained of being sick and became suddenly pallid. He went about the house, however, took his dinner, and thereafter had a sleep. On wakening from this sleep he commenced to vomit, and this continued at intervals during the afternoon. He appeared to be bilious and much troubled with flatulence; scarlatina was not suspected. In the evening a doctor was summoned, who treated the illness lightly. During the night, in his sleep, he was grinding his teeth, rambling, and talking, and shook as if in a rigor. About 4 a.m. he had a convulsion, and at 7 a.m. another; each of them was said to have lasted ten minutes. He received a very hot bath thereafter, but did not perspire. When I saw him at 11 a.m. his respiration was hurried and laboured; his face very flushed; his pulse scarcely perceptible; his tongue very foul; he was unconscious, and his pupils unaffected by light. While standing at his bedside he had a convulsion which lasted for about three minutes. During this attack he held his breath; each side of his face twitched alternately; his limbs were rigid in extension; his jaws were firmly closed; redness of the face, lividity, and pallor rapidly succeeded each other, and were followed by moaning, hurried and laboured respiration. The pulse could be felt gradually to return. The rigidity of the lower limbs passed off in three minutes after the convulsion ceased, but the upper limbs continued rigid for some minutes longer. He died in about an hour and a half after this attack without regaining consciousness. In this instance there was no

guide to the diagnosis of scarlet fever except the general prevalence of the fever at this time.*

In the case previously narrated the diagnosis was assisted by the careful observation of a rash which was obscurely apparent. In the following instance scarlet fever was the evident cause of the convulsions, because two other children suffering from scarlatina slept in the same room as the patient.

C. B—, æt. 4½ years, during the night of September 9th, 1874, was observed to be restless, but wakened in the morning apparently in her usual health, breakfasted, and went out to play. She came into the house two hours later, lay down, and soon thereafter she vomited. This appeared to relieve her and she resumed play again. After dinner she ran out again to play, but returned in about an hour and lay down. Having slept well for about an hour she wakened with diarrhœa, and shortly thereafter she had a convulsion. She became unconscious; her body was rigid; her extremities twitched spasmodically; her pupils were unaffected by light, and her jaws firmly closed. She never recovered consciousness and died within eight hours from the commencement of her illness. A hot bath and an enema containing a sedative had no effect in soothing her.

These examples illustrate well the appalling fatality and the rapidity with which this form of blood-poisoning destroys life. No time for reflection is given, no interval for trying remedies; and yet *after death no lesion is detectable.* The poison appears to act through and on the blood, and on the blood alone. The only analogue afforded, moreover, is death in the lower animals caused by the injection of certain fluids. If a few drops of a highly irritant, intensely inflammatory animal secretion be injected into one of the lower animals death results in a comparatively short space of time, and in much the same manner as we observe it to occur among those suddenly and severely poisoned by scarlet fever. Dr. Burdon-Sanderson found that by injecting into the peritoneum of a guinea-pig a few drops of the "exudation liquid charged with bacteria," which he had produced in a similar animal by injecting

* The diagnosis was confirmed by other members of the family subsequently suffering from scarlatina.

a solution of ammonia subcutaneously, this highly inflammatory exudation liquid induced peritonitis of great intensity, which terminated fatally in from twelve hours to two days. When, again, the inflammatory liquid from the peritonitic guinea-pig is injected into the peritoneal cavity of a dog it dies, he says, "with the same symptoms and post-mortem appearances which are produced when an animal of the same species is infected by the injection of putrid animal liquids."* Animals thus treated may pass at once into a state of collapse, or more commonly they exhibit "muscular twitchings and shiverings. The supervention of collapse is indicated by failure of muscular power, retching and vomiting, which are soon followed by diarrhœa. The retching is associated with violent spasmodic muscular movements." Here, then, we find in animals poisoned by the artificial injection of putrid animal liquids a striking analogue to the children described above poisoned by the scarlet-fever contagium; collapse, muscular twitchings, vomiting and diarrhœa, are exhibited by both classes of victims, but in the human subjects we have superadded delirium and other cerebral symptoms due to the higher development of the nervous system in man.

In the 'Lancet' of November 7th, 1874, will be found an instructive paper by Dr. Clifford Allbutt, "On the Modes of Death in the earlier days of Scarlet Fever," well worthy of careful perusal. After stating the four modes in which he considers that scarlet fever may threaten life, viz., hyperpyrexia, specific poisoning, malignancy, and syncope or asthenia, Dr. Allbutt remarks "that in most cases the distinction is tolerably easy, though in others the singleness of the mode may be marred by the coincidence of one or more of the other modes." In my experience two or more of the series of symptoms characterising each of these modes of death are always detectable by close observation; but the important point as regards successful practice is for the practitioner, being aware of these several groupings of symptoms, to recognise the stage of the seizure, to interpret correctly the relative gravity of the symptoms so as to form a correct prognosis, and to use the

* Dr. J. Burdon-Sanderson, 'Preparations showing the results of certain experimental inquiries relating to the nature of the infecting agent in pyæmia.'

treatment appropriate for the alleviation of the condition then existing.

Blood-poisoning, then, is a very important and not uncommon cause of nervous affections in children. I have described only the condition due to *acute* blood-poisoning by one special variety of fever poison, but similar symptoms are occasionally found to usher in other fevers, as measles and enteric fever; while delirium, slowness of speech, occasional slight muscular twitchings, or starting in sleep are the almost invariable accompaniments of severe pyrexia, whether induced by a fever poison or by some local peripheral irritant. So also muttering delirium, jactitation, and coma indicate merely the typhoid or syncopic condition whatever may have been the original form of blood-poisoning. But, in my experience, severe nervous symptoms, if they can be supposed at all to indicate the accession of scarlet fever, should lead to an extremely *wary* prognosis and to judicious *active* treatment; and even then in the majority of instances such a beginning terminates fatally. One distinction further deserves attention; and this was well illustrated by a case which came lately under my care.

A child about seven years old died from scarlet fever within twenty-four hours after she was supposed to have taken ill, and though she exhibited a profuse rash; on the following day a younger sister, about 3½ years old, took ill with similar symptoms, and I was summoned in the evening. I saw the patient for the first time about twelve hours after she was seized. She then presented the characteristic appearance of a case of severe blood-poisoning; respiration was hurried and laboured; pulse not extremely rapid; great restlessness, with some unconsciousness from which she could be easily roused; distension of the veins, especially of the face; temperature of 104° (I have observed the axillary temperature rise to 106°, but have never reached 108°, which is mentioned by Dr. Allbutt as being occasionally obtained); pungent heat of the skin; dryness of the lips and tongue; scanty urine; and great thirst. She was placed in a very hot bath for a few minutes, and, when lifted out of it, she was rolled nude and wet in a warmed blanket, she then received a little wine and water, and was laid in bed for twenty minutes. She fell during this interval into a pleasant

sleep, from which she was roused to be dried, dressed, and fed, and on being again laid down she slumbered sweetly for a couple of hours, and was interrupted only to get food. About four hours after my first seeing her she had a threatened relapse of her symptoms, but this I believe was due to her being allowed to fast too long. She soon recovered from this state and made an excellent convalescence. In instances of this kind, which might be described as cases of pure blood-poisoning as distinguished from those I have before narrated, where the impurity of the blood has led to perversion or arrest of the functions of the nervous system—in cases of pure blood-poisoning before the nervous system has been much involved—the active employment of judicious treatment may be expected to be almost always successful.

The symptomatology, then, of the nervous affections produced in children by reflex action from the application of a peripheral irritant, as a febrile contagium, indicates paralysis of the vaso-motor system, then meningeal congestion, probably both of the brain and medulla, and occasionally ending in cerebral serous effusion. As regards treatment, I agree with Dr. Allbutt in strongly advocating the early employment of a bath in such cases; but my experience has been that whereas cold affusions and the form of bath described by Dr. Allbutt in his paper are no doubt very useful, their application is attended with extreme danger unless they are properly conducted, and I have met with very few persons indeed in whom such trust can be placed. For many years past, accordingly, I have invariably used a very hot bath and the warmed blanket wrapping immediately after it, as I think this is attended with less risk. Such a bath should, I think, be given once in every twenty-four hours as long as the eruption is visible. It is also important to give food and small quantities of stimulants at *very* short intervals of time till the brunt of the pyrexia has been well overcome. As regards medicines in those instances characterised by convulsions, the practitioner feels bound almost to give some sedative even though he may doubt its efficacy; and in such instances if sedatives are of any avail I believe bromide of potassium and gelseminum are the best, and they should be combined with quinine.

Many other forms of nervous derangement succeed scarlet fever and like blood-poisonings, but these I shall group into the third class afore specified, viz., those nervous diseases due to structural changes in the nervous tissues proper. Some further varieties of nervous affections belong to the class at present under consideration, as cerebral anæmia from fever or from cardiac or pulmonary disease, nervous cough, herpes, laryngismus stridulus, &c., but the space at my command does not allow me at present to complete my remarks, though I hope to do so on a future occasion.

TABLE *showing the pathological lesions found in ten cases where it was considered necessary to examine the cranium and where permission was given to do so.*

G. R. S—, æt. 8 months. Symptoms during life pointed to what is termed by many authors "acute hydrocephalus." Post-mortem appearances characteristic of acute meningitis, with effusion of serum and formation of recent lymph.

J. R—, æt. 2 years. Symptoms during life were those of tuberculosis and of intussusception. Autopsy revealed a congested and softened brain and miliary, deposits in lungs mesenteric glands and small intestine. In the ileum were also found several more or less complete intussusceptions.

T. W—, æt. 8 months. Symptoms during life were diarrhœa and convulsions. Post-mortem appearances were congestion of cerebral membranes and some effusion into the lateral ventricles. No signs of tubercle anywhere. Ileum congested at intervals.

G. Y—, æt. 5 months.—Symptoms during life pointed to acute cerebral meningitis. Autopsy revealed brain substance almost fluid, and membranes covered with a layer of lymph almost half an inch in thickness.

A. M. H—, æt. 1 year.—Symptoms during life were those ordinarily included by the term hydrocephalus. Autopsy exhibited traces of scrofulous meningitis over the base of the brain and between the cerebral hemispheres, with effusion into the lateral ventricles, also tubercles in right lung and liver, and scrofulous abscesses over the body.

A. S. T—, æt. 7 weeks.—Symptoms during life were those of hooping-cough, with pneumonia of the pulmonary apices and convulsions. Post-mortem examination showed the meningeal vessels congested and the brain substance softened; all the other organs healthy.

A. H—, 1¾ year old.—Symptoms during life led to the diagnosis of scrofulous meningitis, and this was confirmed by a post-mortem examination.

F. M. W—, æt. 14 months.—Was a case identical with the last in its symptomatology and pathology.

C. H. J—, æt. 3½ years.—Symptoms during life referable to meningitis, with destruction of brain substance. Autopsy revealed a general opaque appearance of the arachnoid; inflammation and subsequent adhesion of the membranes over

the left temporal sinuses; a large amount of recently effused lymph connecting the under surface of the right cerebral hemisphere with the corresponding cerebellar surface. In the centre of the right cerebral hemisphere was an ovoid patch of grey substance, through which white streaks radiated; the whole of the surface of the right cerebellar lobe was covered with scrofulous lymph nodules. Both lungs exhibited tubercular deposit, while the abdominal peritoneum was firmly agglutinated to the parietes and in its various layers, and presented numberless pellets of tubercular lymph scattered through it. All the other viscera were healthy.

A. B—, æt. 1¼ year.—Symptoms during life were those of diarrhœa and convulsions. The post-mortem examination showed slight congestion of the meningeal vessels in the cranium, while the brain substance was healthy. The ventricular fluid was slightly increased in amount. No indications of scrofulous disease to be found anywhere. Small intestine congested at intervals, and Peyer's patches showing a granular surface. Catarrh of mucous membrane in the colon.

TABLE *of certified causes of death in children under* 12 *years of age.*

Acute hydrocephalus	5
Convulsions	8
„ and cynanche tonsillaris	1
„ and meningitis	2
„ and pneumonia	3
„ and bronchitis	2
„ and enteritis	12
„ and pertussis	11
„ and scarlatinal nephritis	1
„ and spina bifida	1
„ and scarlatina	3
„ and syphilis	1
„ and marasmus	1
„ and suppressed measles	1
„ and tuberculosis	2
„ and dentition	2
„ and peritonitis	1
Meningitis and enteritis	4
Meningitis	6
Tetanus and icterus	1
	68

Total number of death certificates given ...	258
„ „ „ for children under 12 years old, in which cerebro-spinal lesions are stated	68
Cases in which autopsies were held	38
Autopsies in which the cranium was examined and pathological lesions found	10

The common forms of nervous affections met with among children under 7 years of age, as obtained from the records of the Wirral Hospital and Dispensary for Sick Children.

	Under 1 year old.	1 to 2 years.	2 to 3 years.	3 to 4 years.	4 to 5 years.	5 to 6 years.	6 to 7 years.
Convulsions or fits	9*	6	3	2	...	...	1†
Spinal curvature, with or without paralysis	1	3	2	6	3	5	2
Inability to walk, or paralysis of a limb	...	2	1	4‡	...	...	3§
Hydrocephalus	3	4	...	...	2		
Cerebral congestion, cerebral, and cephalalgia	2	1	...	1	1	...	1
Chorea	...	...	...	...	1		
Epilepsy	...	...	...	...	1	2	3
Nervous cough	...	...	2	3	...	2	

Here are tabulated 82 cases treated for nervous affections among a total of over 5700.

* In one of these cases the convulsions were caused by fungus cerebri.

† This case was one of compound fracture of the skull.

‡ In one of these paralysis was due to chronic spinal meningitis.

§ In one of these paralysis followed a severe attack of scarlatina.

A CRITICISM OF ESMARCH'S ELASTIC COMPRESSION.

FOUNDED UPON AN EXPERIENCE CHIEFLY OF AMPUTATIONS.

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The subject of the present notice is a method of arterial compression which has for the last year or more been known in connection with the name of Professor Esmarch, of Kiel. The astounding simplicity of the means employed is such that on first hearing of it one might easily think or say, "Why has this idea not long ago occurred to me?" or, "Why have tourniquets been invented and so long used if the same end is to be better attained in this manner?" In what manner? By wrapping a piece of stout india-rubber cord or tubing a few times tightly round a limb. No blood passes the point compressed in either direction, as any one may see proved whenever the method is tried; but some have been puzzled to know why the circulation is not carried past through the bone, for surely this is not compressed. The explanation of this curious fact, which may at first seem almost a paradox, seems to be a purely anatomical one; for the long bones are supplied by two sets of vessels, the medullary for the marrow, and the periosteal for the bone proper. The medullary artery and vein pass to and from the interior of the cylinder through a single hole, being distributed to the marrow; while the bony cylinder itself has a vascular network continuous with that of the periosteum, which is compressed with all the other soft tissues round the bone, in which latter the circulation is consequently

arrested. The whole method includes (1) elastic compression, (2) bloodless operation, and (3) the conservation of the blood of a condemned limb in the system. The blood of condemned limbs has long ago been saved in certain cases, and bloodless operations can, of course, be performed with the aid of different means; every surgeon has wished for such in his time, and many have devised original means for attaining this end, all of which are but natural deductions from a knowledge of the physiology of circulation. In reference to the novelty or antiquity of the method I believe that "there is nothing new under the sun," and I hold that in surgical appliances and practice we need have nothing to do with the question of priority in the adoption of any means. The same invention is frequently made by different persons quite independently of one another, either simultaneously or at intervals of time.

The credit of originality is still the same, but the question of mere priority is one purely of circumstances, and, I take it, of no scientific importance.

I have seen a bloodless state of a wound perfectly achieved in some cases by elevating the limb, and then putting on one of the tourniquets in common use. Nay, I have seen it attained by simple manipulation from beginning to end, the limb being squeezed and rubbed in an elevated position until most of the blood was returned into the body; and then compression practised, in great perfection, with the hands, to the great comfort of the surgeon and the advantage of the patient, but at the expense of infinite trouble and an agony of fatigue to the compressor.

But by far the most efficient way is to bandage the limb tightly with an elastic roller from its distal end to a point above the seat of operation, and then to apply such compression as shall not permit a drop of blood to return; and this is most easily, efficiently, and harmlessly done with an india-rubber cord or tube wrapped several times round the limb, after which the elastic bandage is removed.

In many amputations and other operations it matters little either to the surgeon or to the patient whether a few ounces of blood, more or less, be lost, so that there is not an urgent demand

for bloodless operations as a rule. But there is the great class of cases in which either the patient cannot afford to part with blood without injury to his health, or the surgeon requires a bloodless state of the wound for the purpose of operative accuracy. To give but one instance. Every now and then a tumour attached to a nerve-sheath is met with, and I have known a limb to be amputated for this disease, when, by a bloodless operation, the tumour could have been removed by an easy dissection, or at least an attempt made before resorting to the extreme measure.

Again, in every amputation, and in many other operations on the limbs, arterial compression is necessary, and cannot be better done than with the elastic cord or tube, while in that not inconsiderable class of cases where assistance is scanty the advantage to the surgeon is incalculable, because every vessel of consequence can generally be easily seen and leisurely closed by the operator, quite unassisted, and in the absence of hæmorrhage, for the simple reason that the compression is perfect; it is also more easily applied, as the careful adjustment required in the use of a tourniquet is here dispensed with.

There are surgeons, however, who make much of the free oozing which sometimes occurs when the compressing cord is loosened, and which does not always spontaneously cease within the few minutes grudged by no one to this process. This is a point which I have not overlooked in the observation of the cases I have been permitted to witness, as is that of the influence exercised (as far as can be ascertained) upon the process of union in the wounds made under this method.

I have not seen any oozing of blood, under these circumstances, which was troublesome to the surgeon or detrimental to the patient; nor have I found any characteristics of the healing part which could be attributed to the peculiar method adopted, or which, in fact, differed from those of healing wounds not previously subjected to Esmarch's plan. On inquiry, I find that up to the writing of this paper the number of operations performed by nine different surgeons in Liverpool under the method in question is only about twenty-seven, of which I have been present at sixteen, and performed seven myself.

The method of Esmarch, then, is remarkable in attaining the old and pretty well-known purpose of bloodless operation by the simple and easy means of elastic compression; and it is perhaps owing to this simplicity of means that surgeons have largely adopted, published, and discussed the method.

As far as the literature and practice of the present epoch are concerned the compression by elastic cord is so far new that, whereas a year or two ago it was all but unknown, every one has now heard of it, many have seen it done, and not a few have employed it; and the performance of bloodless operations has, through the use of the particular method of compression, obtained a notoriety which, in comparison with its scanty adoption previously, amounts to a practical novelty.

I shall directly refer chiefly to my own major amputations, performed during a period of nine months; the other cases having served to enlarge the basis of my experience in this matter.

The first case was an amputation in the middle of the thigh of a middle-aged man whose knee-joint was inflamed and open, and who had an excessively bad bed-sore, and from whom it was important not to take any blood if possible. The details of this case have already appeared in the 'Lancet,' so I will only quote in abstract. The blood in that portion of the limb which was to be removed was first returned to him by the tight application of an elastic bandage. Less than half an ounce of blood was lost, and the amount of oozing after operation was obviously slight.

The second case was the removal of a lacerated hand, a recent machine accident, by amputation iu the forearm of a lad. Here no blood was returned into the arm, and the elastic cord was simply used for purposes of compression. It is right to mention that although he went to Wales in a month, another month elapsed before absolute healing took place, in consequence of a minute crumb of necrosis, on the separation of which the open point healed in two days or less. The cause of this minute necrosis, and so great delay in complete healing, was, I am satisfied, due to a slight retention of pus at an early stage of the dressing. The oozing of blood immediately after this operation was no doubt a little free, but was subdued at once by exposure and cold and did

not matter in the least, though very probably a consequence of the tight compression.

In a third case amputation was performed at the knee in a child of four, for inflammation of the joint, no other treatment being considered practicable.

Here, too, hardly a drop of blood was taken away, and the method answered perfectly.

A fourth case was an amputation at the hip-joint, in a boy of six, emaciated to a degree, with a thigh riddled with sinuses, and a hip-joint that had been excised by me four months previously.

The pulse was over 140 and excessively feeble, and the only escape from close-impending death lay through amputation. This was done at the end of November, 1874, after first returning into the body the blood of the condemned limb by elastic bandaging. A pad was placed over the situation of the external iliac artery, and the india-rubber cord wound from the perineum round the groin and buttock, embracing the corner of the pelvis, and being held up on the outer side by being looped over a bandage that encircled the hips.

I have had made for similar cases in future a belt consisting of stout webbing, provided with a buckle, and having attached to it a couple of iron hooks, over which the elastic cord may be passed on the outer side of the hip.

In this last case only a drachm or two of blood escaped before the cord was loosened, and after all visible arteries were tied. After the cord was set free a good number, much dilated, had to be secured; but under an ounce of blood was lost in all. It was here a matter of life and death to preserve the blood, and after a couple of days' prostration, with a pulse of over 160 and scarcely to be felt, the boy began to recover and speedily gained flesh. Not only was he freed from the great pain of this limb, but the acquisition of the blood returned into his body amounted to a positive transfusion from and to his own person. The oozing of blood during the first four or five hours was not more than is usual under any method.

The elastic cord may also be used for amputation at or near

the shoulder, as Esmarch himself has pointed out, and as I have proved while assisting at such an operation. That instance was a good illustration of a case where it was not safe to return the blood of the condemned limb into the body, as there was thought to be phlebitis of a large vein, so the cord was simply placed high up above this from the axilla round the neck and spine of the scapula. It answered perfectly, not a drachm of blood being lost. When phlebitis is known to exist in the part to be operated on it would never do, I think, to squeeze back forcibly the blood from the part concerned for fear of detaching thrombi, which might extend or become emboli; but if even in this case it be important to save blood, the limb may be highly elevated for a few minutes (according to the well-known practice before referred to) before putting on the cord.

Again, even in amputations accompanied at first by loss of blood, under such compression the wound speedily assumes a bloodless state.

A case of amputation at the hip-joint was reported some months ago in one of the journals, and here the blood was returned from the limb and Esmarch's compression used, the elastic cord being applied round the body over a pad on the abdominal aorta. This would, no doubt, be always feasible; but I consider compression of the external iliac for such a purpose far preferable when practicable, in order to avoid such a serious obstacle to respiration as confinement of the abdominal muscles in such a powerful grasp. In operations of such a magnitude the patient is often previously reduced to the lowest point of viability, so much so that both circulation and respiration require every advantage that can be given to them, as in my case just quoted.

This point was clearly illustrated at an operation of Mr. Bickersteth's in the Infirmary in November last, the patient having had serious hæmorrhage from the upper part of the thigh. In the operation of cutting down to look for the bleeding point it became important to remove an abdominal tourniquet which had been placed on the aorta, but which seriously impeded the respirations of a man reduced by hæmorrhage, fever, and shock, almost to his last gasp. I merely mention this in allusion to the

inadvisability of employing abdominal compression in some cases of great prostration, if it can be avoided.

In conclusion, then, having been concerned in practically testing this method from the day, as I suppose, of its introduction into Liverpool, up to the present—a period of about twelve months—I have thought it not unfitting to publish the results of that experience, which, though not extensive, is sufficient to enable an opinion to be formed. Though I have never yet seen or heard of any harm directly or indirectly resulting from the employment of the method, I do not wish to be regarded as a mere advocate of the plan. So far as I have gone in the matter the present criticism embodies the opinion I have of a subject the general adoption or rejection of which is to me a matter of perfect unconcern, but which I have tried to regard with impartiality, and to which I hope to give further attention. I shall be very glad to publish objections to the system when I have found them to be greater than they appear to me at present.

ON EXCISION OF THE OS CALCIS.

By EDWARD LUND, F.R.C.S.,
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The entire excision of the bone of the heel, or the resection of the os calcis, as it is technically termed, is an operation of rare occurrence, and one which must at all times be interesting to the practical surgeon. If we take as our motto in the practice of our art that "every operation is an opprobrium on surgery," or even admit that every operation in which we mutilate the body may deserve that appellation, it must ever be the pleasing duty of the surgeon to endeavour to save as much of a limb as may be possible consistently with the healthy functions of the parts remaining. It would be difficult to enumerate all the various forms of operations which have been devised for the human foot, to save even a small portion of that exquisite mechanism by which the weight of the body is supported and elasticity is secured. Some operations have been performed upon the anterior part only, upon the phalanges and the metatarsal joints, while others have been directed to the removal of those bones which constitute the true tarsus and arch of the foot. Here we have had, as I have myself observed, cases of removal of the entire astragalus, in which afterwards a useful and serviceable foot has been preserved. It is said also that the cuboid has been completely resected; and on many occasions so large a portion of one of the three cuneiform bones has been taken away, that if the whole of the bone has not been extracted at the time of the operation, the spicula, which have afterwards exfoliated, have accomplished its entire removal. But the os calcis, by which, in the erect position of the body, so large an

amount of weight is sustained, is a part of the foot to which the surgeon rarely has the opportunity of directing his exclusive attention; inasmuch as it is found that the cases in which the os calcis only of the tarsal bones is the one diseased, are very rare. Yet I think from the cases I have noted that when once the os calcis becomes subject to disease as a consequence of accident, as, for example, after injury produced by a sudden blow or fall upon the heel, the disease will remain in that bone, and not travel on to the neighbouring bones, for a longer time than we might at first expect; and in many cases of disease of the posterior part of the foot, where sinuses are directed towards the os calcis, the presumptive evidence, I think, will be that the bone spoken of alone is the one affected. Not so if we consider the changes which might go on under similar circumstances in the astragalus. Here we seldom have disease of long continuance without the lower portion of the bones of the leg participating in the same action, and this will lead to the large and important joint of the ankle being quickly damaged.

I have lately had three cases of disease of the os calcis in which I have performed the operation for the removal of the entire bone, and with such success as to lead me to publish them in these 'Reports.' They have all occurred within the last eighteen months, the first being in a young man under twenty years of age. He had had an abscess and sinuses in the neighbourhood of the heel, chiefly on the underpart, for more than twelve months, and had injured the foot by a fall some time previous to this. He was of a delicate, somewhat strumous, diathesis, but when first admitted into the Infirmary did not present any other distinctly constitutional indications. After the operation had been performed, and when the recovery seemed almost complete, symptoms of disease in the left lung showed themselves. He went back to the country with an irritating cough, and this, I heard afterwards, increased. Hæmoptysis set in, and although I have not heard of the case for many months (and, unfortunately, I do not know the address), I fear it has passed into one of acute pulmonary decay.

The second case was that of a woman, aged about 35 years,

who had suffered from sinuses and diseased bone in the neighbourhood of the os calcis for more than twelve years. During the early part of that time, when under the care of the late Mr. Beever, she had a great quantity of dead bone removed by gouging, and for five or six years the parts remained healed and sound. About three years before her last admission into the hospital the inflammation had returned, fresh abscesses and sinuses had formed, and it was doubtful whether or not the disease had extended beyond the bone in question. She underwent the operation I am about to speak of about eleven months since, and on examining the case within the last week I find she has a very serviceable foot and is able to walk with considerable ease. There is some stiffness in the ankle, as far as the movements of the astragalus in the tibio-tarsal joint are concerned, but this she says has been the case ever since the first attack of inflammation many years ago. She can now bear pressure upon the foot, and walks with but very slight appearance of lameness.

The third case is at present in the hospital. It is that of a boy, about 15 years of age, upon whom I operated on the 17th October last. The case at present bids fair to make a good recovery, for the wound discharges very slightly, and for the greater part of its extent is now healed, although, as I shall presently explain, from the great depth of the cavity whence the bone has to be removed, there must be constant demand for new matter to fill it up.

Now the remarks I am anxious to make have reference chiefly, if not entirely, to the particular mode of operating which I would advocate in this form of resection of bone. My colleague at the Infirmary, Mr. Southam, tells me he has had several cases of resection of the entire os calcis. One of them made an excellent recovery, and became a very useful nurse in our Infirmary, where she was always actively engaged in walking about, and her walking was quite as nimble and quick as if no such operation had been performed.

I am not aware how the other cases ultimately terminated, but I believe it was satisfactorily. I may here observe that it was while assisting Mr. Southam in two of his cases that my attention was

invited by him to a much more simple form of incision for the extraction of the os calcis than I think has been previously practised by surgeons; and I should wish to give Mr. Southam the credit of having originated the idea that so large a bone as the os calcis could be removed from the foot by a single incision, extending only over its external surface, or that which lies in relation with the outer ankle. But for the more particular details of this operation, and the exact directions which I am anxious to give to those who may wish to adopt this method of performing it, I would hold myself responsible, as in the three cases just referred to, and upon each occasion I have followed very exactly the same plan. If we refer to the text-books for the various modes of extracting the os calcis, I think we shall find that surgeons have been very liberal in their incisions, and have cut through structures in the foot which one would have thought would have been better not divided. In that excellent epitome of the history of operative surgery in relation to the human foot, which consists of a summary of lectures given by Prof. Hancock before the Royal College of Surgeons of England, the author has explained in detail, and almost in chronological order, the different modes of operating which surgeons have followed for this purpose. He mentions nearly forty cases of entire removal of the os calcis by British surgeons, all of which have been performed within a comparatively short period. The first operation dates as early as 1848, and was performed by himself; but with much credit he waives his claim to be the originator of the method, inasmuch as the case did not terminate favorably. But a similar operation, performed by Mr. Greenhow, of Newcastle, only a few months afterwards, having proved successful, with three others by the same surgeon, Mr. Hancock, with graceful generosity, has paid him the compliment of suggesting that in future this operation for resection of the entire os calcis shall be designated "Greenhow's operation." In reading the details of these different methods of proceeding it seemed to me that it would be possible to simplify the operation very considerably, and for this purpose I have followed the plan I now proceed to describe.

The incision which I make is commenced at the back of the foot, just on the internal side of the tendo Achillis, on a line with the middle of that part of the os calcis between which and the tendon the bursa is placed, so that the first portion of the incision being carried boldly down to the bone, this bursa is opened and the tendon set free. The incision is then carried round to the external side of the heel, and so directed that it shall pass along a line extending one third down from the tip of the external malleolus to the under-surface of the foot, with a slight inferior convexity, then carried on to the spot where we know the os calcis and the cuboid are in contact; and this, speaking roughly, will be at a point midway between the tip of the malleolus and the end of the prolonged extremity of the fifth metatarsal bone. In doing this it is well to remember the position of that little projecting tubercle of bone which, lying on the external surface of the os calcis, gives steadiness to the tendons of the peronei muscles, so that the incision may come just below this point, and thus, if possible, avoid wounding those tendons. The incision being carried down as here indicated, very little more division of structure by a sharp instrument is needful, for it will often occur that the periosteum of the os calcis is so loosely attached to the bone, by reason of previous inflammatory effusion, that it can be very easily detached. Should this, however, not be the case, here and there the tissues must be divided by the scalpel; otherwise I have found at this stage of the operation no instrument more useful than one of those bone scrapers or periosteum-knives which are used for detaching the hard palate from the bone in operations for fissure in the mouth, and which are sold in the case of instruments employed for that purpose by Mr. Annandale, of Edinburgh. Of course any convenient form of periosteum knife will serve the purpose. In this way I detach the soft structures first from the underpart and back of the os calcis and, if possible, I even carry the separation as far as its internal surface, so that after a little perseverance and time—and here I may remark that the operation for the removal of the entire os calcis must necessarily be a very tedious one—I am enabled to get the tuberosity of the os calcis to project through the wound by

slipping the lower flap well under the bone. The next step in the operation consists in the detachment of the os calcis from the under part of the astragalus, and here it is necessary to proceed upon the upper part of the wound, where, it will be noticed from its position, we have only to work over one third of the distance, and in doing this I take great care to detach the tendons of the peroneal muscles from the side of the bone without injury, which can be done if a sharp scalpel be not used. Having by a slight movement of the os calcis got a little guide to the joints between it and the astragalus, I find that by employing the "astragalus hook" which I have described in the 'British Medical Journal,' 19th October, 1872, much trouble is saved, for it is strong enough to act as a lever for separating the bones, and then, by bearing in mind the oblique direction of the calcaneo-astragaloid ligament, we can without difficulty cut through these fibres, and pull down the os calcis an appreciable distance from the astragalus. Having done this it only remains to separate the os calcis in front from its junction with the cuboid, and here, at first, there may be difficulty in discovering the position of the joint. In order that I may be able to move the os calcis freely, I take firm hold of it, not with the lion forceps of Sir W. Fergusson, which are often so useful in such operations, but with forceps such as are occasionally employed in amputations for the removal of any additional piece of bone from the stump. These are generally made of such a size that the blades fit very well upon the line of the tuberosity, and with the increased leverage thus obtained there is little difficulty in twisting the bone, and moving it about in such a way as to impart to the finger placed over the front part of the wound a sensation of movement between the os calcis and the cuboid. Here a few touches of the scalpel will divide the dorsal calcaneo-cuboid ligament, and as soon as sufficient space is obtained, the astragalus hook may be here introduced, and partly by leverage, and partly by its cutting action, it will set free the lower calcaneo-cuboid fibres and liberate that portion of the bone. A few portions of fibrous tissue will generally remain lying to the front and the internal side of the os calcis. These have often given me

much trouble for their complete division, yet I have found that the astragalus hook has here again served me well. To use it is safe, for it cuts through the tissues partly by laceration, which helps in some degree to restrain the hæmorrhage, and it can also be used as a lever with considerable force, and yet each incision made by it is short and limited. It will be seen in this way that the os calcis can be entirely extracted; and provided that in all the incisions which are made during the operation, the instrument (whatever it may be which we employ) is kept close to the bone, no structures of any great importance can be divided, and in none of the three operations which I have performed has the patient complained of any symptoms of nervous pain which might lead me to think that any large branch of the plantar nerves had been injured. With regard to the vessels, the hæmorrhage has on no occasion been excessive; in my last operation a branch from the back of the external plantar artery bled very freely, but the flow was easily stopped by torsion. No doubt it was one of those running backwards as a calcanean branch. As soon as the os calcis has been thus got out it becomes our duty to ascertain, either by the finger, or by ocular examination, what may be the condition of the under-surface of the astragalus and of the posterior surface of the cuboid. Here, if the cartilages are roughened or destroyed, or if the bone should appear to be softened (as occurred in one of the three cases I have mentioned) it will be right to gouge away, or by some other method remove, all the softened bone we can get hold of. And supposing the diagnosis to be correct as far as the movements of the ankle are concerned, and the condition of the internal border of the foot, it may be assumed that no other bones will require to be interfered with.

As regards the after-treatment of these cases, I must here repeat what I have so often had occasion to state in previous papers in these Reports, that each case has been conducted as strictly as possible on the antiseptic system. But in reference to this plan there are a few points upon which I deem it well to offer some observations. In the first place, I have observed in this operation especially, and in most operations upon the foot,

that the antiseptic system seems to be here less successful as far as entire avoidance of putrefaction is concerned than in almost any other part of the body. Why this should be so is rather difficult to say; but I believe it is partly due to the fact that serum and sero-pus when secreted at this distant portion of the body, far away from the centres of the circulation and the nervous system, have in some way less resisting vital power, and are disposed to undergo more rapid decomposition: or else it may be that, in each of these three cases, there had been for a lengthened period before the operation, old diseased bone and old sinuses in the soft tissues in which fœtor had remained for several days notwithstanding my adoption of Prof. Lister's plan of injecting these sinuses freely with a strong solution (forty grains to the ounce) of chloride of zinc immediately before beginning to operate, so as if possible to destroy absolutely all present putrefaction, and start, as it were, afresh upon healthy tissue. The only means by which I think it might be prevented in any future case would be, first of all, to take care as soon as the bone is removed, to bring the edges of the incision somewhat in contact, drawing up the depressed flap from the sole of the foot, and making the cavity from which the bone has been removed as complete as possible; then to fill the cavity with a strong watery solution of carbolic acid, allowing it to remain there for a few minutes, and then repeating this process for two or three times in succession. This is an excellent method of cleansing recent wounds of a deep figure, since by reason of the wound being filled with the lotion, there is the best possible chance of the surrounding tissue becoming thoroughly saturated with it. The other method, which I have already tried in similarly deep wounds with much benefit, though not with complete success, and which is certainly meritorious, is to stuff the wound with strips of cere-cloth or antiseptic gauze dipped in a solution of glycerine and carbolic acid (one part in ten), so as to supply useful pressure that shall arrest the oozing from the smaller vessels, and also act as a good receptacle and absorbing medium in which the blood can soak, and be protected from putrefactive change. In fact, it is now my constant practice in all operations conducted upon

the antiseptic principle, to cover the wound immediately after the operation, with six or eight folds of cere-cloth steeped in this carbolic glycerine. I find that the blood which oozes from such wounds falls into the cere-cloth so prepared, and mingling quickly with the glycerine forms an impervious covering to the wound, from which, when first dressed, it can be easily removed. As to the necessity for using the india-rubber drain-tube in these cases, if I have employed strips of cere-cloth and glycerine to project beyond the centre of the wound, and to be removed on the second day after the operation, I find they leave sufficient outlet for all future secretions, providing the patient can be persuaded to keep the foot and leg resting on the bed entirely on the external side, in which case the drain will be perfect, and there will be no serious accumulation within the cavity. I generally use about four or five sutures at the time of the operation, introducing them from each angle of the wound nearly up to the centre, and leaving a portion in the middle unclosed, through which, as I have said, the strips of cere-cloth are to be drawn. As the cure advances to completion the surgeon will often notice that the lower edge of the incision has a great tendency to become inverted and drawn in beneath the upper edge. This, in my second case—that of the woman who made so good a recovery, gave me some anxiety, for I thought it would spoil the ultimate result by making the heel smaller and flatter. But I found that gradually this inversion of the edge subsided, and at last without any special interference it became placed opposite the other portion. In none of the three cases have I yet had any complications in the way of abscesses at a distance from the wound, or inflammation along the line of the tendons, and I attribute this entirely to the careful employment of antiseptic measures.

In the case of the woman just referred to there is only one thing to note, namely, that she experiences a great tendency to involuntary inversion of the foot unless she takes great care while walking to place it firmly and flatly upon the ground. I have no doubt the real cause of this is that the peroneal muscles having lost one of their fixed points of traction, viz. the bony tubercle on

the os calcis, although the longer of the two tendons may still play through the groove in the cuboid,—their combined action on the external border of the foot, and the power which that one possesses of drawing down the internal as well as raising the external border of the foot, the tibial muscles, especially the tibialis anticus, will be unbalanced, and the internal side of the foot thus become lifted too much upwards, will be drawn also slightly backwards. This will account for the somewhat shortened appearance of the foot which has been observed to occur after removal of the os calcis. Of course the heel must be flattened, and there must be to some degree a diminution in the actual length of the leg; yet with all this, as we see so constantly in slight loss of length of limb after fractures and other injuries, the patient can with very little effort accommodate himself to the change of proportions, and while watching him in the act of walking, the inattentive observer would scarcely perceive any difference in length.

As I said at the commencement of this paper, my chief object has been to introduce to the profession a particular mode of incision, and a special method of proceeding in the removal of the os calcis I desire also to put on record another illustration of the beneficial results which in such cases may be secured by careful after-treatment. It must ever be remembered, however, that before such an operation is attempted, the surgeon should satisfy himself that other less serious steps might not have been taken; viz., partial excision, or, at least, repeated efforts to remove diseased bone, by the use of the gouge or of the osteotome. And beyond even these precautions we must not forget that a judicious selection of cases will always have more to do with results, and doubtless has always had more influence in regulating the statistics of successful operations, than any careless or blind adherence to the presumed necessity for special treatment in special cases.

A NOTE ON THE SO-CALLED PSORIASIS PALMARIS.

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The very facilities for observation afforded by skin eruptions have to some extent impeded their correct appreciation; the symptoms being recognisable by the eye alone, making no obvious call upon the reasoning faculties, lend themselves easily to the pernicious habit of artificial or scholastic classification. And hence diseases presenting similar objective features place the observer in much the same position as a schoolmaster who has been entrusted with twins: 1st, he thinks they are both absolutely alike; 2nd, when he sees them apart he mistakes one for the other; 3rdly, he becomes doubtful if there is even a family likeness between them.

Willan's classification was founded on the discrimination of the various elementary lesions of the skin without any especial reference to the pathological processes actually at work. Diseases producing scales belonged to squamæ, and as the palm and sole were seen to be subject to an eruption accompanied by scales, it only required the slight exercise of the process of exclusion to fit the name psoriasis on to the eruption in question; and though modern research has advanced enormously our knowledge of essential pathological facts, so that we can properly subordinate what is accidental or consequent, yet the name bestowed in error is still familiar in our mouths, and serves, I think, to perpetuate a mistaken view of the diseases now under consideration.

Psoriasis of the palm is extraordinarily rare, though the affec-

tions passing under the name are of frequent occurrence. I have watched inveterate cases of psoriasis for months together, seen the disease extend its limits to the very edge of the palm and there stop, but I have never seen it invade the flexure surface of the hand.

The essential characteristic of psoriasis is the hyperproduction of epidermic scales. This takes place in all stages of the disease, when it is spread over large tracts of skin, and when it shows in papules no bigger than a pin's head, when the corium is thickened by reiterated chronic attacks, and when the patches are recent and almost level with the surrounding skin. The uppermost scales are thrust away from the subjacent layer of epidermis by the growth of new scales, so that, when we examine a case of psoriasis in its primary condition, we find little heaps of epidermic scales, silvery white in colour, and, if carefully detached, having half formed scales as their basis; if these (as generally happens) are detached we find a raw surface which bleeds but does not exude other fluid. As regards the deeper changes (though much remains uncertain) it seems to be ascertained that the disease affects the superficial portion of the corium, especially the papillary layer, that in consequence of greatly increased cell proliferation the papillæ are hypertrophied and the circulation in them very stagnant. But if we now examine a patch of squamous eczema in a similar manner, we find in the first place that the primary condition of the affection is not one of scaliness but of exudation, more or less gradual, in the superficial layers of the corium, and beneath the horny layer of the epidermis; this exudation is accompanied by increased cell-growth and migration, as in inflammation of other tissues. In chronic cases the deeper portions of the skin become infiltrated, and the epidermis is formed at a greater rate but with less perfection than in health. Hence scales are formed, but only in chronic cases, and only so much in excess of the natural rate of epidermis growth as is justified by the increased activity of the skin and efforts made to repair loss. So that we have in one disease an essential primary condition of scaliness, in the other a secondary increased growth of epidermis; the one disease is essentially dry,

the other essentially moist; the prime feature of one is cell-growth, of the other soakage of the tissues; the one in its most typical form approaches the character of a new growth, the other of an inflammation.

Now, if we examine cases of the so-called psoriasis palmaris we are able to note, first, that the scales are not new formations, but the desquamation is caused by broken and partially detached epidermis, the shreds if removed renew themselves but slowly, and on lifting them from their bed an unsuspected oozing is frequently to be found. We must also take into consideration that sufferers from psoriasis palmaris do not suffer from psoriasis in other parts of the body, the main selective seats, elbows and knees, remaining unaffected; and also that the victims of general psoriasis—a most obstinate, spreading, and recurrent disorder—have almost, if not quite, invariably unaffected palms and soles. But, on the other hand, we find eczematous subjects suffering from the condition generally termed psoriasis palmaris. A healthy-looking, but nervous, woman was sent to me with both hands and forearms covered with a severe vesiculo-pastular eruption of some months' duration. In front of the neck, and stretching upwards towards the ears, was a well-marked patch of eczema. There was no evidence of scabies or of syphilis. I took the precaution of examining the elbows and knees and inquiring as to previous skin complaints, but found no reason to suppose the patient had ever been a sufferer from psoriasis. By appropriate treatment the disease was mitigated, and the skin became everywhere smooth and healthy except the palms of the hands and the finger-nails. The centre of the palm first healed, but the eminences remained for weeks red, thickened, fissured, and in the ordinary sense of the word scaly. The appearances, in short, were those of the so-called psoriasis palmaris perfectly displayed, and by no means easy to distinguish from the similar affection due to syphilis. Now, if the patient had only been seen in the latter stage of the attack it might pass for a typical case of psoriasis palmaris; the previous history shows it to be really the fag end of an attack of eczema.

Few diseases of the skin better repay treatment and attention

in terms of management, few are more hopeless if left to "nature" or treated on wrong principles.

The following case may serve as an example:—A gentleman in easy circumstances, but of a nervous anxious disposition, came under my care. He had been subject to the disease for many years, in the right hand especially, which at his first visit had the epidermis of the palm and portions of anterior surface of fingers torn, broken, and fissured in all directions, the subjacent skin being inflamed and thickened; nowhere would the scales scrape off in silvery flakes, no sensibly moist exudation was visible. The scales were constituted by shreds of epidermis, detached at their circumference, but attached by their centres. He had been under many practitioners, who seem to have had a suspicion of syphilis—a suspicion not confirmed to my mind by investigation either of objective symptoms or the patient's history. Taking into consideration the bilateralism of the disease, its recurrent nature, and the nervous type of the patient, I placed him at once on six minims of Fowler and half a drachm of liquor potassæ, and ordered him to rub in an ointment composed of seven parts zinc and one mercurial. I may mention that mercury was not used antisyphilitically, but in accordance with my usual local treatment of chronic exudative diseases accompanied by much thickening. In three weeks the physiological effects of arsenic were beginning to show themselves, the infiltration of the skin much reduced. The medicine was diminished to one half, and a weak preparation of oil of cade rubbed into the part affected. In five weeks a slight pinkiness of the palm and an imperfect line of desquamation along the ulnar margin of the hand were the only evidences of the disease left. He considered himself cured. This case yielded much more readily than usual to treatment, owing probably to the fact that the patient was in sufficiently easy circumstances to keep his hand at rest till the cure had commenced. It is far otherwise with workmen who cannot forego the use of their hand. Like eczema in other parts of the body it is much influenced by external irritation. I have almost always one or two workmen in attendance at the dispensary; they derive benefit from the use of ointment, but are practically

incurable—unless on strike. In a less degree this applies to patients of all classes, and it is a useful practical fact to remember that if a case is more than usually obstinate, and there is no mistake in the diagnosis as regards syphilis, some external source of irritation is probably at work. And here we see the importance therapeutically of regarding this affection as eczema rather than psoriasis. The latter disorder is one produced by causes acting from within; external irritation seems to play no part in its production, nor has it been experimentally imitated. On the other hand, eczema is especially determined by external agencies and easily produced experimentally. Hence, although the local treatment of psoriasis is very like the treatment of chronic eczema in principle it must differ in degree. The somewhat rough and severe handling which is often the only mode of removing chronic psoriasis is in itself sufficient to maintain or even to increase the violence of an eczematous attack.

The main points to be attended to in the treatment are obvious, but I may, perhaps, briefly glance at them.

The hand must be kept at rest, the employment of tools, driving, fingering samples, and so forth, absolutely forbidden. The horny layer of the epidermis is thicker and less porous than in other parts, and should be softened by prolonged packing with wet compresses, solutions of potassa fusa, soft soap, or borax, according to the severity of the case. Except while these are being applied the palm should be kept thoroughly anointed with grease; if there is much infiltration and thickening of the corium an ointment containing mercury should be employed—weak citrine, the mercurial ointment one to seven or six, or the oleate of mercury, full strength. When the inflamed patches are very indolent I think the best results are got with the iodide of sulphur ointment rubbed in frequently. Any spots resisting the action of these remedies should be lightly touched with the acid nitrate of mercury so as to produce a raw surface. The case will be completed as in chronic eczema of other parts by stimulation with tar, the oil of cade being the nicest preparation. Some discrimination is required in apportioning the amount of soothing or stimulating treatment necessary in any given case, but as a

general rule a case that remains stationary under soothing applications requires a stimulant.

As regards the general treatment, bilateral recurrent chronic cases are favorably influenced by arsenic; it should be given in full doses aided by an alkali, or if intestinal irritation is easily set up guarded with a little bismuth and tiny doses of opium. The patients will frequently be found suffering from some error of assimilation or excretion tending to produce that condition of debility most favorable to the onset of eczema.

The habit of counteracting with alcohol the torpidity induced by a sedentary life is often a great obstacle to success. The patients obstinately refuse to believe they can maintain their strength without stimulants, or that they take more than is absolutely necessary for their well-being. A glass or two of wine at dinner does no harm—may possibly do good by aiding digestion, but beer and spirits and drinking between meals should be forbidden. No other dieting is, as a rule, necessary.

The so-called syphilitic psoriasis palmaris, it may be remarked, is not a form of psoriasis at all, but the tubercular or lenticular syphilide modified by the peculiarities of the portion of skin attacked. It derives its importance as indicating a strong dose of the poison, and demands thorough uncompromising antisyphilitic treatment not only for its own sake but for the future. The patients are, as a rule, robust, and do not belong to the class of subjects in whom the destructive inflammatory lesions, such as rupia, ecthyma, suppurative iritis, &c., are noted, the difference being that in one case the severity of the attack is probably due to the amount or intensity of the inoculation, in the other to the indisposition of the attacked tissues to maintain an adhesive inflammatory action.

It often lingers after all other cutaneous manifestations of the taint have ceased, and patients who have suffered from it, no matter how good their apparent health may be, should be emphatically warned of a stage of relapses following that of latency, and especially prohibited from marrying for a lengthened period. I have memoranda of two cases which came under my care for this particular manifestation, in whom, after a period of latency, slight

cerebral symptoms appeared with double neuro-retinitis, requiring, of course, most active treatment. It appears to me that this local disorder always indicates a persistence of the syphilitic taint far greater than would be supposed from the amount of accompanying secondary symptoms, and this little practical fact becomes of great prognostic value, enabling us to predict with tolerable certainty an attack of great chronicity, strongly inclined to recur after long intervals of latency, and requiring steady mercurial treatment for its eradication.

THE DURATION OF THE INFLUENCE OF MEDICINES, ETC.

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No one can have examined Dr. Jahr's book on 'Materia Medica' without being struck with the short notice, "Duration of Action," thirty, forty, or fifty days, and when I saw that a duration of about six weeks (I am quoting from memory) was attributed to the action of a single dose of "calx carbonica," "graphite," and some other substances commonly thought to be inert, my attention was roused to such an extent that for the last fifteen years I have never ceased to make such observations as would tend to elucidate the truth on this point. Reason soon demonstrated how absurd it was to believe that a gourmand who swallowed an oyster from its shell, or an artist who touched the tip of his blacklead pencil to cause it to make a darker stroke, could be under the medicinal influence of the so-called drugs for the space of a month. Experience showed that a man who took a dose of opium felt its influence in a few minutes and ceased to be affected by it in a day. But medicines have been repeatedly compared to poisons, and many that the physician employs in small doses are used by the murderer in large, *e.g.*, arsenic, opium, antimony.

Furthermore, certain diseases are commonly believed to have what is called a poison origin, such as measles, scarlatina, small-pox, typhus, clap, dysentery, yaws, influenza, and the like, and all these have a tenure differing amongst each other, yet moderately regular amongst each. A patient with measles gets well in a certain number of days; another with clap requires a certain number of weeks. A man bitten by a poisonous snake is dead

or well again in a day, while another bitten by a poisonous dog is not affected in any way for six weeks. The mosquito, bug, wasp, and hornet affect man instantaneously, whereas the tsetse (a peculiar African insect pest) does not affect the horse at all, and it only affects the ox long after the last has been bitten. It is then perfectly clear that the duration of the influence of foreign substances over the human body is by no means a constant quantity, and if it be variable it behoves us to investigate it to the utmost of our power.

Many considerations should induce us to do so, yet singularly enough no investigation on this point has hitherto been systematically carried out by allopathic writers. On the one hand we find traditions of poisons which lie in the system for days, weeks, or months, before they operate, and on the other we have drugs so potent that their effect seems instantaneous. Vaccination produces its effects in a week; its influence often remains for life. Syphilis does the same, while the influence of ergot of rye on a parturient female is over in half an hour.

The importance of the investigation is enforced by certain phenomena of disease. Clap, for example, is a disease arising from the persistent action of a poison (as some believe); it has, therefore, to be counteracted by the persistent action of a remedy (if any can be found); the same may be said of syphilis and some few other poisons, *e.g.*, lead, and mercury. The remedy has, therefore, not only to be selected but to be administered in such a manner that its influence shall not be intermitting. To use a homely illustration of our meaning: food is the material which counteracts death by hunger, but it will be of small utility if only administered in the form of a banquet once a fortnight.

This example helps us to another complication, viz. that food is taken for the sake of comfort as well as to preserve life, and we may add that the majority of eaters enjoy it as a luxury. Consequently we have to study the *dulce* as well as the *utile*.

This short preface has, we presume, sufficed to show that materials influence the body in various ways. We may now add that the same material does not influence all animals in the same way. If the mongoose were affected by the cobra in the same

proportionate manner as other animals, we cannot understand how it could go to seek (as it is said to do) a tree whose leaves would cure it. A rabid dog influences by his bite a sheep and horse sooner than he does a man, and a pregnant woman resists for days that ergotine influence which a parturient female acknowledges at once. We draw therefore the deduction that the subject under consideration has to be considered in details rather than on general principles. Yet experience has forced us to the conclusion that there is little real difference in these details. Of course it will be understood that it is impossible for any writer to investigate the whole of the 'Materia Medica' with a view to ascertain their actual merits under all possible circumstances. I cannot therefore pretend to do anything more than enunciate the conclusions I have formed respecting a few drugs in general use. Let us begin with various articles of food which richly deserve the title of medicines, and are frequently the sole means employed by the physician to restore his patient to health.

Arrowroot or other farinaceous aliments when made with water, as usual, do not act as food for longer than about half an hour, nor can we wonder, for if we see the real amount of solid which suffices to make the mixture gelatinous, we find that it does not equal the amount found in a single wine biscuit. If boiled with milk the duration of influence is about as long as the same amount of milk, with about half an hour added for the arrowroot and sugar. The addition of wine makes the effect a little more decided, but not more enduring.

Bread and milk under ordinary circumstances, when taken in a quantity equal to half a pint or pound, lasts for three hours or thereabouts.

A glass of pure milk with half an ounce of rum in it acts as food during two to three hours.

The feeding influence of an equal weight of tea and bread and butter lasts for about the same time.

The duration of an ordinary solid meal of meat and vegetables varies from four to six hours. If the quantity taken exceeds the average the influence is proportionally lasting.

The influence of wine varies with that used, and other circum-

stances; as a general rule the feeding effect of a glass of sherry is limited to half an hour.

A tumblerful of ale or porter solaces hunger for two or three hours, according to circumstances.

We will not speculate on the reasons why there is a variety in the satisfying power of certain foods, it suffices to have shown that such exist. In like manner certain medicines have more lasting influence than others. This is practically known to all observant physicians, who not only think it their duty to select a medicine but to prescribe the frequency of its use. Let us take a few familiar examples.

Chloroform inhaled in the ordinary manner operates in the course of a few minutes, and its effects cease a few minutes after its withdrawal; an almost constant inhalation, then, is required if we wish to produce an enduring effect.

Ergot of rye is another medicine whose effects are readily seen and which rapidly pass away. The accoucheur who administers a dose anticipates the result in less than ten minutes, and if he see none in fifteen or twenty minutes he repeats the dose.

The poisonous effect of prussic acid is seen almost instantaneously, and where recovery follows it seems to be complete in the course of half an hour.

On the other hand, the influence of strychnine in poisonous doses is delayed for some hours, and its action is evident for a day or even two.

Mercury ordinarily requires a long time ere the manifestations of its presence are seen, and a considerable period elapses after the drug is withdrawn before its effect ceases.

Lead operates in a similar manner.

Between these extremes there are many intermediate points.

Let us now bring forward a few practical observations which extended experience has enabled us to make.

The effect of a dose of quinine, say five grains, passes off in about four hours. If, therefore, we use it for the cure of ague three doses daily, or one very large one, are not sufficient. I have repeatedly seen intermittents cured by this drug given every four hours after it has failed completely when given at longer intervals.

[illegible]

I know of no more decisive evidence of the influence of habit than the following. I have a patient who is in the habit of taking a dose of opium every night at bed-time. Formerly a single grain was sufficient to produce the full effects of the medicine; of late years I have been obliged to increase the dose to two grains, and now I very rarely see it accomplished. When used in an ordinary case it produces the intended effect in three and a-quarter hours, consequently two of these doses will suffice.

of medicine besides simple drugs I will endeavour by an easy transition to pass from the domain of the physician through that of the surgeon to some farther ground which is common to both.

There are patients in hospital, as well as private practice, who come under the surgeon for "primary sores," and who subsequently reach the medical side of the infirmary for "secondaries." For a moment I will imagine that the applicant has a regular Hunterian chancre, hard as a bit of gristle, and nasty looking as a chronic ulcer of the leg. Mercury is ordered almost as a matter of course. The patient asks, or at least says to himself, "How soon will the medicine affect the disease?" Nor is the supposed query to be neglected, for unless the sufferer is taught to understand that there cannot, under any circumstances, be a decided change before the end of two weeks he will, as hundreds of patients have done ere now, take ten times the dose of the physic prescribed for him under the idea that he will get well ten times sooner. To such individuals I would say "You never must expect to see a daily change until about ten days have elapsed; then you may begin to measure the ulcer with a measuring paper. You may consider yourself lucky if by strict care you get well in a month."

The same or another patient comes with a face marked by "secondaries;" again mercury, in an appropriate dose, is ordered. At this point the clinical M.D. will tell "his following" how soon they may expect to see effects—a very slight diminution in colour in a week, decided improvement in a month.

The value of even the feeblest attempt at precision under such circumstances is that every failure compels both teacher and student to endeavour to correct the basis upon which the opinion propounded was formed.

Again, let us imagine that a patient has an ulcerated leg or an ulcerated throat, neither of which are of specific origin, and let me for a moment more indulge in the fancy that both are treated by my favourite application—laudanum in water, one part to three or four. The sufferer eagerly seeks to know how soon he may hope for a cure. His earnestness affects us, and in our

mental vision we see the results of prospective visits, and say "You will be all right in a month: possibly the time may be six weeks." One knows that no medicine, whether used locally, generally, or both, will cure an ulcer in a day. When, therefore, there is any distant lesion to be repaired it is necessary to form a definite opinion how long the system requires, under the most favorable circumstances, to do the work. The surgeon thoroughly understands this matter when he has to deal with a simple or a compound fracture. I cannot imagine that any one but a bone-setter would give a pill or plaster to cure a fractured ulna in a week.

As we have indicated that there are other means of cure besides drugs, we may recur to the matter now and speak of rest.

It is probable that every doctor in advanced life has a thorough appreciation of the inestimable value of the remedy—rest. But few have investigated the time required for its influence to be recognised, and for the continuance of repose necessary to cure the affection which excessive labour has brought on.

When a doctor consults a builder as to the length of time required for the construction of a new dwelling, the reparation of an old one, the alteration of a consulting-room, or the conversion of a hall into a patients' waiting-room, he expects that the architect will be able to give him a definite idea of the duration of the process of change and the probable cost. In like manner, when a layman consults a physician who counsels rest, he desires to have some definite idea of the extent of the demands to be made upon his patience and his purse. In direct proportion to the precision and correctness of the builder's estimate, we esteem him as a man of business, and in like manner a doctor is weighed in the balances.

What, then, we may ask, is the value of rest, and what its duration? To the weary traveller the duration of the influence of rest is about twelve hours. To a man whose brain is exhausted twelve days will give repose, and imminent insanity can only be staved off by unintermitted mental laziness of a year's duration. As the effects of one day's muscular exertion will in the delicate extend over a whole week, so to prevent those effects recurring,

more than a sennight is required. The duration of rest required to cure myalgia varies from six weeks to six months.

I have seen severe muscular pain produced by a day's over-exertion in a convalescent disappear in four days, but where a person has habitually done far more than is fit a far longer interval is required. This is the greatest in the consumptive and in the old. One patient who had lost four brothers and a mother from phthisis lay in bed six weeks ere he was cured of myalgia of the back from using a heavy hammer. Another, who came in for "angina pectoris," and had arcus senilis, was in hospital three months ere he recovered from pain in the abdominal muscles.

But rest alone will not cure "wasting palsy" nor always restore normal vigour to men who have given away to sexual excess.

If the expenditure of muscular or other vigour has been carried beyond a certain point, rest will not reinvigorate. Amaurosis from prolonged use of the eye is not cured by dark rooms, nor impotence by most perfect chastity.

It is, therefore, as we may didactically sum up, not necessary only for us to teach our young students, or any other man, to select a remedy, but to give the patient an idea what we desire the medicine to effect and the duration of time which will be required ere a repetition of that which we recommend will effect a cure. Everybody desires to obtain the confidence of his clients, and those will succeed most effectually who have just grounds for expressing their own confidence as to the probable time required to repair human damages.

ON THE SENSE OF TASTE

AND ITS

RELATION TO FACIAL PARALYSIS AND ANÆSTHESIA.

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Of all the special senses the sense of taste is the one which has received least attention, and appears to have excited least interest in the mind of students of nervous phenomena; yet there are many points in the physiology of this sense which are extremely interesting and curious, and its pathological modifications are by no means unimportant. Very recently Schiff, Prevost, and other physiologists have laboured to determine exactly the course of the nerves of taste from the tongue to the brain, and it is especially this point which we propose to discuss here. We shall relate the conclusions which these observers have arrived at by experiments on the lower animals, and we shall also examine how far certain morbid states of the nerves of the face throw light on the matter.

In discussing the sense of taste we must begin by excluding from consideration some sensations which are popularly included under that term. For example, we often speak of a rough or warm or mucilaginous taste, these being really common sensations, which the tongue, in common with other very sensitive parts of the body, readily perceives by its nerves of touch, &c. Again, we speak of aromatic, ethereal, putrid tastes, these being really sensations of smell, perceived by the nerves of smell at the back of the nostril. Moreover, we shall find it convenient also to exclude from present

consideration some true tastes which are of complicated character, such, for instance, as sour taste, salt taste; for the substances possessing these tastes, when brought in contact with the tongue, must give rise to a strong chemical action on the surface, which will affect the nerves of common sensation in the tongue in the same way as these irritants affect other sensitive surfaces, and so give rise to a complex sensation. It is better, therefore, to restrict our view to the simple typical tastes, sweet and bitter, and we shall thus be able to determine with greater accuracy the extent and arrangements of the organ of this special sense.

The peripheral organ of taste is placed in certain parts of the tongue and fauces. We commonly hear the palate spoken of as if it were an important seat of this sense, but it is only in a mechanical way that the palate is at all subservient to taste, the pressure of the tongue against it causing the sapid substances in the mouth to dissolve more rapidly, and bringing them into more close contact with the taste organ in the tongue. I have repeatedly satisfied myself by experiment that a bitter solution applied very carefully to the palate, so as not to run down to the fauces or back of the tongue, is not tasted. When we come to investigate in what parts of the tongue taste is situated, we find that it is limited to a very small area, namely, the anterior portion of the tongue, at its tip and sides, and the back part in the neighbourhood of the circumvallate papillæ, together with the adjoining surfaces of the pillars of the fauces. The under surface of the tongue and the greater extent of its dorsal surface possess no power of perceiving taste. We have thus two taste-areas, the front and the back of the tongue, and they differ, not only in situation, but also in nervous supply, and, to some extent, in function. The first—the anterior portion of the tongue at the tip and edges—is supplied by the lingual branch of the fifth nerve, the sensory nerve of the face; the other—the back of the tongue and the adjoining pillars of the fauces—is supplied by the glossopharyngeal nerve. It is now generally admitted that the terminal branches of both of these nerves receive impressions both of common sensation and of taste from their respective areas of distribution. Now, though both these taste-areas have the power

of perceiving both sweet and bitter tastes, they differ in this respect—the anterior area is much more sensitive to sweet tastes, and the posterior to bitter tastes. A simple experiment will easily satisfy any one of the correctness of this. It is for this reason that when we wish to enjoy the agreeable taste of a sweet substance we retain it in the front of the mouth, pressing it against the teeth with the tip and edges of the tongue while it gradually dissolves. When, on the contrary, we wish to enjoy an agreeable bitter fluid, as, for instance, some wines, we press it between the palate and the back of the tongue, thus bringing it into contact with the part which perceives bitter tastes best, at the same time forcing the aroma upwards towards the posterior nares.

I shall pass by the subject of the minute anatomy of the peripheral arrangements of the nerves of taste, and the peculiar taste-cones of Schwalbe and Lovén, which are found nowhere else but on the protected sides of the circumvallate papillæ and on some of the fungiform papillæ. A full description of these curious structures is to be obtained in Stricker's Histology.

We must now consider what are the nerves which transmit the sensations of taste from the tongue to the brain. No doubt exists as to the nerve of the posterior area. The glosso-pharyngeal, as already stated, is the nerve of taste for this part. It is distributed to the back part of the tongue, and to the adjoining portion of the fauces, and it appears to be to a slight extent a nerve of common sensation; its main function, however, is that of taste. Various observers record that dogs in which both glosso-pharyngeal nerves had been cut devoured food and milk mixed with colocynth without repugnance. I am not aware that the records of pathological anatomy contain any observations which throw light on the functions of the glosso-pharyngeal nerve. The cases of disease affecting this nerve mentioned by Longet are incomplete, so that reliable conclusions cannot be drawn from them.

When we come to the consideration of the nerves of taste of the anterior area of the tongue we enter on a field of great doubt and disputation. Two nerves pass to this part of the tongue—the hypoglossal or ninth nerve, the nerve of motion, and the lingual branch of the fifth nerve, which is the nerve of common sensation

for the anterior two thirds of the tongue.* By many this is called the gustatory nerve, and it is generally considered to be a nerve of taste as well as of common sensation. Two difficulties, however, arise to prevent our accepting the fifth as a nerve of taste. One is that cases have been observed where complete anæsthesia of the fifth nerve has been present with loss of feeling in the face and tongue, but no loss of taste. Second, certain forms of paralysis of the portio dura of the seventh, or facial nerve, where the lesion exists above the point at which the chorda tympani branch leaves it to join the lingual branch of the fifth, have been observed to be accompanied by loss of taste in the anterior part of the tongue of the corresponding side; and this would lead to the opinion that it is not the lingual branch of the fifth itself, but the fibres which it receives by the chorda tympani from the seventh, that convey sensations of taste from this anterior portion of the tongue to the brain. The determination of this point will depend mainly on careful observations of disease affecting these nerves in the human subject, for it is very difficult to interpret results of experiments performed for this end on the lower animals. I shall therefore proceed to consider the results of clinical observation in cases of disease of the fifth and seventh nerves.

First, what are the results of paralysis of the facial nerve on the sense of taste in the anterior part of the tongue? No case, so far as I know, has been recorded where facial palsy of peripheral origin has been associated with any affection of taste,† but there are numerous instances where the lesion was situated *above* the origin of the chorda tympani in which taste was lost in the anterior part of the tongue of the diseased side. I shall relate two cases of this kind which recently came under my notice, and in which I carefully investigated this matter.

* See Fig. 2, page 211.

† Since writing the above I find that Eulenburg mentions some cases of "*disturbance of taste*" from injury of the facial nerve below the origin of the chorda tympani, and he concludes that there is a communication between the lingual nerve and the terminal branches of the facial, through which some of the taste-nerves pass to the facial.—Eulenburg, 'Lehrbuch der functionellen Krankheiten,' p. 302.

[illegible] of deep origin. [illegible] of tongue on same side.

[illegible] was admitted into the Northern Hospital September [illegible] suffering from complete facial paralysis of the left side. The usual appearances characteristic of paralysis of the portio dura were present, but there were no anæsthesia or symptoms of lesion of any other cranial nerve. There was considerable swelling of the left cheek about the zygomatic arch, and much pain was felt on pressure in front of the ear and at the stylo-mastoid process, and movements of the lower jaw were impeded. The following was the history of the patient.

"He has just arrived from a three months' voyage. About two months ago, while at sea, he felt one night severe pain in the left brow and ear. The pain in the brow has continued, more or less, ever since, and is usually worse at night. There has also been swelling of the left brow, which has only lately disappeared. About one month ago he began to have pain in mastication and tenderness in front of and behind the ear. He did not notice any of the paralytic symptoms till ten days ago, and at that time the swelling passed from his brow to the cheek, and he then first observed that he could not smoke on that side, and that his food accumulated between the left cheek and gums. He had a chancre and suppurating bubo seven years ago, but no secondary symptoms."

The urine was of low sp. gr., contained some albumen and hyaline and granular casts. He was treated with iodide of potassium, under the influence of which he greatly improved, the swelling and tenderness of the cheek being to a great extent removed. Some time after admission the sense of taste in the tongue was carefully tested. The tongue was protruded from the mouth, and a strong solution of sugar, or of quassia, was thoroughly applied with a brush to various points of the surface, his answers being given by signals with the hand. The sensibility to touch was equal on both sides of the tongue. The sense of taste was normal in the right half, for he was able to taste both sweet and bitter solutions at the tip, edges, and posterior part of the surface

on that side, but not at the middle and anterior part of the upper surface, which we know is never sensitive to taste. The sweet solution was best appreciated at the tip, and the bitter solution at the back part. With the left half of the tongue he was not able to detect any difference between the bitter and sweet solutions in the front of the tongue; in fact, he merely felt the pressure of the brush; but when either solution was applied far back near the root he at once tasted it. No difference in the appearance of the two sides of the tongue could be detected. The temperature under the left half was 0·2° F. higher than the right. There was no dryness of the mouth or deficiency of saliva; on the contrary, for some time he had a superabundance of that secretion, arising apparently from irritation of the left parotid gland from the swelling of the cheek. There was no loss of hearing. I regret I cannot give the completion of this case, as the patient abruptly left the hospital on October 6th. He was then much better, and even the facial paralysis was beginning to disappear. There can be little doubt, from the general symptoms, that the lesion of the portio dura here was of syphilitic origin, affecting the nerve in some part of its passage through the bone, and therefore above the origin of the chorda tympani.

CASE II.—*Facial paralysis following disease of internal ear. Loss of taste on corresponding side of tongue.*

Joseph C—, æt. 33, cab-driver, was admitted into the Liverpool Northern Hospital January 17th, 1874, suffering from complete paralysis of the facial nerve of the right side. He stated that he had suffered from chancre and bubo in 1862, followed about a year after by inflammation of both eyes and some eruption on the skin of the legs. In 1866 he suffered from pains in the shin bones. Nearly a year ago he began to be affected with pains in the head and right ear, which have increased much in severity, and for which he has been under treatment at the Eye and Ear Infirmary for the past three

months. It is only a few weeks since the twisting of the face was observed.

He has the usual characteristic symptoms of complete paralysis of the portio dura of the right side, including falling down of the right posterior arch of the soft palate. There is no anæsthesia of the face, nor any symptom of the other cranial nerves being involved. The pupils of both eyes are fixed and irregular, having been the subject of former inflammation. Hearing is abolished on the right side. No discharge from the ear. There is so much tenderness of the meatus that it is with difficulty that any view of the membrana tympani can be obtained, but so far as one can see it is not perforated.

Pulse 80, very weak. He suffers much from nausea and vomiting, and sleeplessness on account of the pain in the ear.

He was treated with iodide of potassium in large doses, and had one or two blisters behind the ear. He remained in hospital about six months without any material improvement, sometimes a little better and again prostrated by the pain or by attacks of nausea and continued vomiting. No improvement took place in the paralysis, and no change in the condition of the face, except that on May 15th it was noticed that he could not turn the right eye outward, there being partial paralysis of the sixth nerve on that side.

Shortly after his admission the sense of taste was carefully tested, and it was found to be entirely absent from the right side of the tongue, though the sensibility to touch remained perfect. In this case taste was absent from posterior as well as the anterior portion of the right half of the tongue, from which we must conclude that the disease which had involved the facial had also extended to the glosso-pharyngeal. As the glosso-pharyngeal is the afferent nerve in the reflex act of vomiting produced by tickling in throat, could it be that the syphilitic deposit which was probably present in the brain, and which by its pressure on these nerves were causing the loss of taste, at the same time by propagating an irritation along the central portion of the glosso-pharyngeal nerve might give rise to reflex vomiting? There was no evidence of disease of the stomach, and the vomiting was

not like "cerebral vomiting;" it was more continuous, and was accompanied by nausea. I have seen this man recently, and find his condition unchanged, except that he is now sinking from exhaustion.

These cases and numerous others which have been recorded by various observers point strongly to the conclusion that the nerves of taste of the front of the tongue pass upwards to the brain by way of the facial nerve, and must therefore, of course, pass from the tongue to the trunk of that nerve by its chorda tympani branch. Experiments on the lower animals, by section of the chorda tympani or of the facial above that branch, are much less clear in their results, owing to the difficulty of interpretation; but still, on the whole, they support this view (Claude Bernard, Schiff, Lussana). Claude Bernard has proved that the chorda tympani is the motor nerve to the submaxillary gland,* and it has been suggested that this nerve only influences taste by means of this connection with the submaxillary gland; that when the chorda tympani is paralysed the secretion of the gland is diminished, and the tongue becomes dry and unable to perceive tastes. But in both the cases which I have recorded there was no difference between the two sides of the tongue as to moisture or appearance. Moreover, Prevost has recently proved that a portion of the fibres of the chorda tympani pass to the tip and edge of the tongue,† and so have an immediate relation to the anterior taste-area. Vulpian considers it is a vaso-motor nerve both to the submaxillary gland and to the mucous membrane of the tongue, and only in this way has the power of disturbing taste; but this is hypothetical. It has also been supposed that it acts as a motor nerve to erect the papillæ, and so is subservient to the sense of taste, but this is a pure guess. Wilde records a curious fact which supports the view of the chorda tympani being a taste nerve. He says that when the membrana tympani is

* Bernard, 'Lecons,' &c., ii, 148; Flint's 'Physiology,' iv, 158.

† Prevost divided the chorda tympani in dogs, and a week after he examined the terminal branches of the lingual nerve, where he found degenerated fibres.—'Journ. Anat. et Phys.,' vii, p. 343.

perforated and caustic is applied: it is in many cases tasted in the mouth almost immediately, but only on the side to which it is applied. Patients say they feel the impression of the caustic running down along that side of the tongue, but not reaching the tip. I never knew this peculiarity except when there was a hole in the membrane. Is it transmitted by continuity of mucous surface or by means of the chorda tympani?"*

Whether the taste nerves of the chorda tympani accompany the facial nerve to its origin in the brain, or again leave it, we shall enquire later on.

We have now to speak of the effect of lesions of the fifth on taste. If across division of the lingual nerve below its union with the chorda tympani causes loss both of sensibility and taste in the front of the tongue: but division above that point, according to Schiff and Lussana,† abolishes only sensibility, and not taste. Not only experiments on animals, but also many observations of disease of the fifth nerve in man, give this result. One of the most interesting of these is a case related by Dr. Noble, of Manchester,‡ of a woman, aged fifty, who had complete anæsthesia of the left half of the face and tongue without loss of motion. The sense of taste, however, in the left half of the tongue was unimpaired, "while its common sensibility is all but destroyed. To impressions of tact, of pain, of the rough or the smooth, of heat or of cold, she is all but insensible, while to impressions of the bitter or the sweet, or any other modification of the sense of taste, she is as acutely alive on the affected as on the sound half of the tongue."

Similar cases are recorded by Schiff and Lussana§ and by Romberg.‖

The following illustrative case recently came under my notice.

* Wilde's 'Aural Surgery,' p. 305.
† Flint's 'Physiology,' iv, p. 195.
‡ 'Med. Gaz.,' 1835, xv, p. 120.
§ 'Journ. Anat. et Phys.,' vi, 227.
‖ Romberg, i, 258.

CASE III.—*Anæsthesia of the fifth nerve of the right side without (at first) loss of taste in the anterior half of the tongue.*

John C—, æt. 43, miller, was admitted to the surgical wards of the Northern Hospital January 31st, 1874, having fallen forty feet from a hoist. On admission he was unconscious and bleeding from the right ear. There was also fracture of the right clavicle, arm, and ribs, and emphysematous swelling over the chest. The right eye was ecchymosed.

Next day he had partially recovered consciousness and was very irritable, and abundant serous fluid was oozing from the right ear.

February 5th.—In consequence of the delirious symptoms which had shown themselves for the last two days his head was shaved and blisters applied.

7th.—Delirium abated.

14th.—He is now quite sensible, says he has much less pain in the head, and feels much better.

16th.—Loss of sensibility was noted on the right side of the face (it is possible this may have existed from the first).

18th.—There is paralysis of some of the facial muscles on the right side. Serous fluid is again discharging from the ear.

19th.—Facial palsy is more marked—in fact, is nearly complete—on the right side; the tongue also is protruded to the right side. His temper is very irritable.

His state so far as the face was concerned did not alter much after the last date.

On March 20th he was transferred to the medical wards, and came under my care. His condition then was noted as follows:—"He complains of numbness of the right side of the face, and of singing in the ears. There is partial paralysis of the portio dura on that side. When the face is at rest there is not much dragging of the mouth observed, but when he is requested to raise the upper lip so as to show his upper teeth, the paralysis is at once evident. He cannot whistle or puff the cheeks. He can only half close the right eyelid; but he can knit the brow, though not so well as on the left side. The tongue is protruded straight.

"There is complete insensibility of the skin of the right side of the face and scalp in front of a line drawn vertically from the top of the ear, and bounded below by the margin of the lower jaw (see Fig. 1). There is a small area of the cheek (shaded light

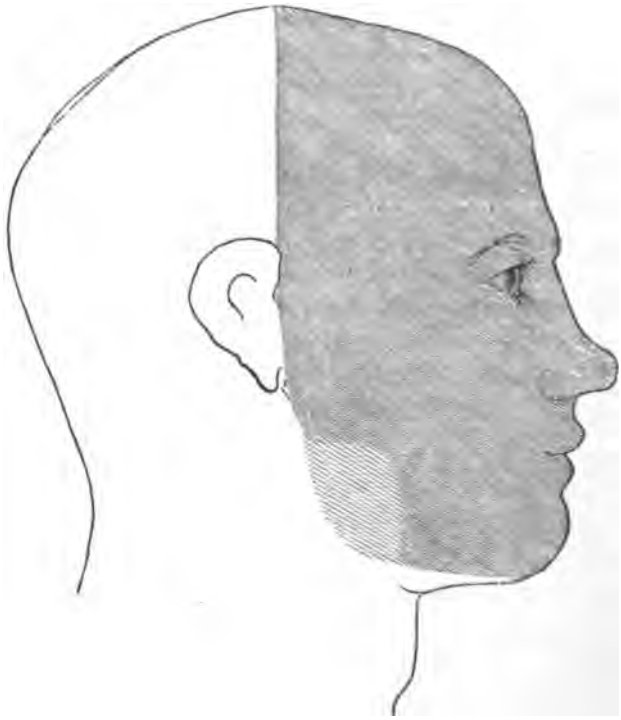


FIG. 1.—CASE OF ANÆSTHESIA OF FIFTH NERVE.

The dark portion shows the extent of total insensibility. In the light-shaded part the sensibility is only very slightly deficient, being supplied with cutaneous nerves from the cervical plexus. The clear portion is normal.

in the drawing) which is supplied by nerves from the cervical plexus, where the sensibility is nearly complete. There is slight vascularity of the conjunctiva of the right eye, and a little dimness and superficial ulceration of the cornea. Pupils normal. Sensibility is absent from the right side of the tongue, but taste appears normal. No apparent paralysis of the muscles of mastication. There is total deafness of the right ear. No paralysis of the palate. General health good."

A few days later the sense of taste of the anterior of the tongue was carefully tested, the tongue being protruded, and syrup being applied to different points with a brush. It was found that, though he recognised the sweet taste equally well with both sides of the tongue, yet the recognition was delayed on the right side as compared with the left. There was no difference in the appearance of the two halves of the tongue. He remained in hospital till May 5th, during which time considerable improvement took place in the paralysis of the seventh, but the anæsthesia of the fifth remained unaltered. The state of the affected eye also was greatly improved.

On May 17th he was readmitted on account of the unsatisfactory condition of the right eye. There was chemosis, and ulceration of the cornea, and hypopion. The paralysis of the facial nerve was much less marked, but the anæsthesia remained as before and the taste unaltered.

After about two months' residence in hospital, the progress of the disease of the right eye having been checked, he was again dismissed and resumed work.

On October 3rd he was seen by me and his condition was as follows. "The facial palsy has disappeared, but the anæsthesia of the right side of the face remains complete. There is general opacity of the cornea, but the eye is now free from any active disease. There is complete deafness on the right side. The sense of smell is imperfect; he thinks especially so in the right nostril, which is also sore. As regards taste, it is *now absent* in the anterior part of the right side of the tongue, which is also quite insensible to touch as far back as the circumvallate papillæ, but at the posterior part he both feels and tastes. This was repeatedly and carefully tested. When the tongue was drawn into the mouth after some sweet substance had been placed on some part of it he thought then he felt the taste all over the tongue. No wasting or other change of the right side of the tongue can be either felt or seen. The temperature of the inside of the right cheek is 0·4° F. less than that of the left, and under the right half of the tongue 0·3° F. less than under the left."

In this case the injury received was probably a limited frac-

ture of the base of the brain, and the lesion of the fifth nerve of the right side was complete, and was either simultaneous with the fracture or resulted very soon after, though the anæsthesia was only observed later on when his delirium passed away. The lesion of the portio dura of the seventh nerve, on the contrary, was due to secondary changes, probably the pressure of inflammatory deposit, and the nerve was only partially paralysed, and again completely recovered itself. The persistence of the sense of taste at the right margin and tip of the tongue, which were quite insensible to touch, was fully established, and led me to look upon this case as another proof that the fifth nerve is unconnected with taste, but the subsequent change and the apparent disappearance of taste is puzzling.

It is now, however, necessary to state that some observations that have been made on this subject do not agree with those I have related. There are many cases recorded of anæsthesia of the fifth nerve where taste was abolished on the affected side. Romberg collects four such cases, though it must be acknowledged that in all of them the facial or chorda tympani either was involved or may have been.* Dixon relates two cases in which taste was lost in connection with anæsthesia of the fifth, without involvement of the facial;† other cases are referred to by authors, but not given in full detail.‡ Some experiments also have been made, the results of which coincide with these cases, but Longet acknowledges that it is very difficult to divide the fifth in the cranial cavity without also injuring the facial.

We have, then, two contradictory series of observations as to

* Romberg, 'Nerv. Syst.,' Syd. Soc., ii, p. 252. In the first case the tumour, which pressed on the fifth and caused paralysis, also involved the seventh; in the second the tumour extended to the internal auditory foramen; in the third, where the paralysis was caused by exudation in the neurilemma of the inferior maxillary branch of the fifth down to the otic ganglion, it is not improbable that the disease may have really extended a little lower down than appeared to the naked eye, and involved the chorda tympani. In this case the disease was of four years' duration. In the fourth case, which was the result of a gunshot wound, there were very extensive changes at the base of the brain and a large wound of the neck, and no record is given of the state of the facial or chorda tympani.

† 'Med.-Chir. Trans.,' xxviii, 1845.

‡ Eulenburg, op. cit., pp. 300, 301.

the effect of lesions of the fifth nerve on the sense of taste. The one series represents no loss of taste as occurring, the other shows abolition of taste in the front of the tongue. How are we to reconcile them? If there have been errors of observation, on which side do they lie? To my mind the evidence is stronger for the view that the nerves of taste pass from the tongue by the chorda tympani to the facial.

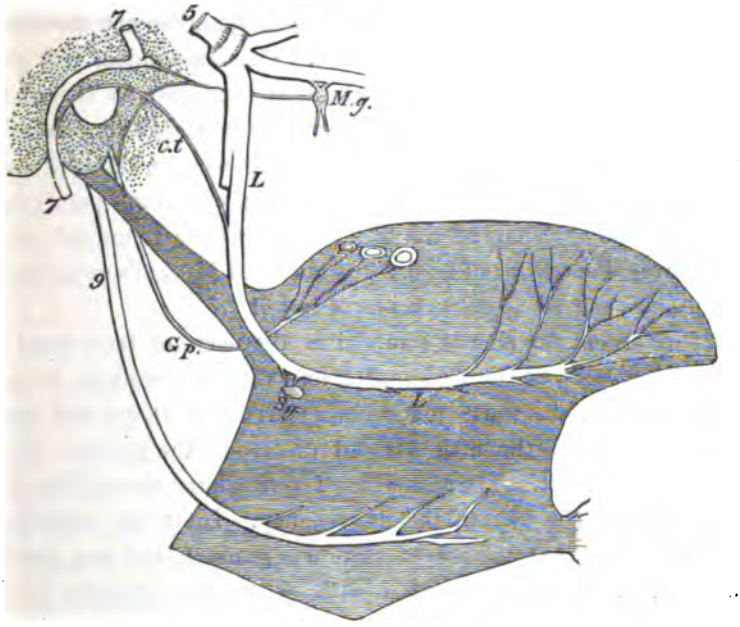


FIG. 2.—DIAGRAM OF THE NERVOUS SUPPLY OF THE TONGUE.

5. The fifth nerve. *L.* Its lingual or gustatory branch, supplying the anterior part of the tongue with sensibility.

7. The facial nerve, or portio dura of the seventh giving off at its bend the great superficial petrosal nerve to Meckel's ganglion, *M. g.* *c. t.* The chorda tympani nerve, passing from the facial to the lingual branch of the fifth. *S. g.* The submaxillary ganglion. *G. p.* The glosso-pharyngeal nerve going to the back of the tongue and the circumvallate papillæ; a small twig passes from it to the great superficial petrosal nerve.

9. The hypoglossal nerve; the motor nerve of the tongue.

From the trunk of the facial they may pass direct to the brain, probably by the intermediary nerve of Wrisberg, which connects the portio dura and portio mollis of the seventh nerve. This inter-

mediary nerve enters the medulla along with the portio mollis and is connected with a distinct nucleus of grey matter. Schiff has propounded a different view of the course of the taste nerves, which is intended to meet the difficulty that lesions of the fifth nerve as well as the seventh appear to give rise to loss of taste. He thinks that the taste nerves, after reaching the facial by the chorda tympani, accompany it as far as the geniculate ganglion (shown in the diagram), and then leave it by the great superficial petrosal nerve, to Meckel's ganglion (*M.g.*), and so are associated with the second division of the fifth. One anatomical fact gives some support to this view, namely, that according to Owen* the chorda tympani in the horse and calf may be shown by dissection to be continuous with the great superficial petrosal.† But this will not account for those cases in which there was total paralysis of all the three divisions of the fifth, and yet taste remained intact. Moreover, Prevost has found the removal of Meckel's ganglion on both sides caused no disturbance of taste.‡

If we accept the chorda tympani as the nerve of taste from the anterior portion of the tongue, the only difficulty we have to meet is how to explain those few cases recorded by Dixon and others of anæsthesia of the fifth without disease of the seventh, where taste was also lost. The case which I have related above (Case III) may furnish the key to the discrepancy. In it the anæsthesia was complete, but the loss of taste was gradual, and was possibly a secondary result, connected with progressive changes in the tongue itself, due to the altered nervous condition. So it is possible that in Dixon's case there was an earlier period when no loss of taste existed.

The subject must be considered as still in an unsettled state, and we shall look for further observations and experiments which may throw new light upon it.

* 'Hunter's Collected Works,' iv, 194.

† Schiff gives a case in support of this theory.—'Centralblatt,' 1873.

‡ 'Journ. Anat. Phys.,' May, 1874.

ON THE TREATMENT OF GONORRHŒAL OPHTHALMIA.

By GEORGE E. WALKER, F.R.C.S.,
SURGEON TO ST. PAUL'S EYE AND EAR HOSPITAL, TO THE SCHOOL FOR THE BLIND, AND TO THE HOSPITAL FOR SKIN DISEASES, LIVERPOOL.

My object in this paper is to bring before the readers of the 'Hospital Reports' a mode of treating the above grave disease which differs materially from that advised by all the text-books and almost universally followed by ophthalmologists. I presume no apology is necessary for so doing, inasmuch as the disease is of interest to most people, practitioners or laymen; to the former because every medical man is called upon to treat gonorrhœa at some period of his professional life, and therefore his eyes are liable to the disease; and to the latter since, if we may believe Ricord, 90 per cent. of them are at some time or other the subjects of the urethral affection. Of its grave importance to medical men the case of a well-known eminent surgical writer, who a few years ago lost an eye from this disease, acquired from a patient, will be a sufficient example.

It may be convenient first to describe a typical case which I had the advantage of watching from the first, and which was treated, as far as caution would allow, after the methods authoratively laid down, then to detail the reasons which led me to depart from such methods to some extent, and to relate cases treated after the altered plan.

Early in June, 1872, I was called to see A. B., a not very robust young gentleman, for a supposed severe cold in the eye. I found the usual signs of this—redness and slight swelling of the eyelids and of conjunctiva, and some mucous discharge. He was advised to keep indoors, to use a collyrium of acetate of lead, gr. ij to the ounce of distilled water, and to take an aperient.

Next day, however, the symptoms had so greatly increased in severity that I ordered him to bed, without at first suspecting gonorrhœal infection. But, during the time necessary for the patient's donning his night-dress, suspicion was aroused and I found that he had a virulent urethral discharge. The gravity of the case was at once apparent, and measures were taken accordingly. The sound eye was carefully sealed up with plaster, the edge of which and the skin adjacent were thickly coated with collodion. The temple was freely blistered. The lids of the affected eye, which could scarcely be opened even at this early period, were covered with pieces of lint made cold by being laid on a block of ice; the discharge was frequently syringed away with a weak solution of Condy's fluid, the lids were kept from sticking together and so penning up the discharge by frequent anointing with oil; also it was sought to lessen the tension of the ocular conjunctiva, which was in a state of chemosis, and that of the upper lid by scarification; later on, when inspection of the eye itself was prevented by the great projection of the upper lid, the conjunctiva of the latter was painted with a solution of glycerine of tannin, the strength of which was increased day by day, but never so as to cause pain. Great caution was indeed necessary lest a small temporary increase of pressure on the cornea should cause it to slough altogether. Nevertheless, it was never thought great enough to warrant the extreme procedure of dividing the outer canthus.

The disease appeared to run its course without being markedly checked by the treatment, but at length on the seventh day of attendance—ninth of disease—a slight change for the better took place, the tension of the lids, as shown by their swollen shiny red appearance, began to lessen and a stronger solution of the lotion could be borne without pain.

I used the glycerine of tannin for two reasons—first, because I believed that the lead lotion employed at first, though very weak, had aggravated the disease, and I thought it probable that other metallic salts would do likewise; and secondly, because I hoped that the glycerine would lessen the inflammatory thickening of the

by the copious watery discharge which it has the power of bring-

ing from mucous surfaces.* The giving of pain was carefully avoided; the glycerine of tannin lotion was strengthened so as never to cause it. For most of the time the very cold lint was borne, but after the climax of the disease the patient preferred the lint to be merely dipped in iced water and wrung out before being placed on his lids.

All this time, too, the general health was well attended to. General bleeding was not practised, but the heart's action was kept within bounds by the cautious use of aconite, and the bowels were compelled to act freely every day.

About the twelfth day of the disease the swelling of the lids had so far lessened that I was able to explore the whole of the cornea, and found in its upper part the peculiar groove which is usually produced in cases of such severe character as the one in question. This groove is described by authors as an ulcerated groove, but when one is able to see it, it presents the signs of a healing ulcer, namely, the edges are not excavated or even sharp, but the whole looks as if it were cut out with a gouge chisel and the edges scraped round. In this instance the groove began at a point level with the outer commissure, about a line from the sclero-corneal junction, and continued parallel to it for a third of the circumference of the cornea. The outer end of the groove was deeper than the inner. The patient was warned about touching his eye, and the treatment continued. All went on well till the twenty-second day, when "twixt sleep and wake" the patient bored his knuckle into his eye with the result of causing a considerable rupture of the cornea at the outer end of the groove and a corresponding prolapse of iris. Of course there was much irritation set up, and atropine was used to allay this, which it soon did. But as it was found to favour the bulging of the iris, after the first symptoms of irritation had passed away a solution of extract of Calabar bean in glycerine, one part to sixty, was cautiously used; this kept the bulging part as small as possible, and the groove filled up and the perforation healed without any other accident. Optically the eye was not notably impaired; the pupil was of course slightly altered in shape, but in a few months afterwards

* See Marion Sims, 'Clinical Notes on Uterine Surgery.'

the patient averred that he was unaware of any difference between the affected and the unaffected eye.

Now, in reviewing the foregoing case I am unaware that I could have done better with the light which I had at the time, save that more might have been done to protect the cornea from mechanical injury. The patient had, however, been so quiet during the acute stage that it was thought unnecessary.

I am aware I did not adopt the heroic treatment advocated by some authors, namely, that by application to the conjunctiva of powerful caustics, such as strong solutions of nitrate of silver, or even of the solid stick of this salt. In the case in question I simply dared not. Between the first and second day of visitation the disease had made such a leap, and the patient had so much pain at and after the instillation of the weak lead lotion, that I could not help thinking that it had been intensified thereby. But the other measures were well followed up. Scarification in the earlier stages was freely employed, though I never ventured on the extraordinary plan advocated by Mr. Soelberg Wells, who proposed to treat generally by iced compresses, but after scarification to use hot sponges for encouragement of flow of blood. Surely it is not good practice to alternate a temperature little above freezing point with one as hot as can be borne.

It may be well to digress here and recapitulate more particularly the course recommended by the chief writers during the last twenty years. Mackenzie, fourth edition, 1854, advises free bloodletting, both by venesection (10 to 30 oz., leeches 6 to 24); scarification of conjunctiva, and even cutting out of folds of it; free purgation, diaphoretics, alteratives, as calomel with opium, or instead of these iodide of potassium. Of local treatment, he says that "Soaking them—the eyes—constantly with tepid water, or laying emollient cataplasms over them, would be almost certain destruction, and, on the other hand, a perpetual succession of stimulating solutions and salves would be not less detrimental."

Careful cleansing away of discharge is insisted on.

Of astringents and escharotics, he condemns lead and zinc lotions, and prefers nitrate of silver, of a strength of two to ten grains to

the ounce of distilled water. He mentions also that some practitioners* trust entirely to touching lightly the conjunctiva with the lunar caustic pencil. But he says, "I conceive that if only caustic is employed, without depletion, the eye is very likely to be lost." Counter-irritation he strongly advises from the very first.

Next in authority, thought not, perhaps, in time of publication, Stellwag von Carion advises the use of nitrate of silver much as Mackenzie does, preferring it to the solid stick, but acknowledging even weak solutions may act prejudicially. General bleeding he does not mention, but speaks favourably of local bleeding.

Of iced compresses, used as in the case above related, he speaks highly. The division of the outer canthus is to be made "if the danger appears very great."

Scarification and exsection of folds of the chemotic conjunctiva are at least untrustworthy.

Fano, in his account of the treatment of this disease, is noteworthy only through his mention of Gouzée's plan, in which "on cautérise les *quatre* paupières, alors même qu'un *seul œil est malade.*" There is also a rap at English surgeons in the person of Sir Astley Cooper, who in 1829, on a visit to Dupuytren's clinique, was shown a young man affected with gonorrhœal ophthalmia. Sir Astley advised the coaxing back of the urethral discharge by means of a sound kept in the urethra and the administration of a pill containing five grains of calomel every two hours until the production of salivation. The eye, however, he adds drily, burst two days afterwards in spite of this treatment.

Fano, however, thinks no better of Dupuytren's treatment, which consisted in the blowing in of calomel once or twice a day, and in the evening of instillation of laudanum.

Bader and Wells concur in reliance on iced compresses, cauterization by mitigated nitrate of silver, local bleeding, and scarification. Wells alone advocates application of warm sponges after the latter operation, as above mentioned.

Through all these recommendations there runs a very evident

* *Vide* Desmarres, 'Traité théorique et pratique des Maladies des Yeux.' 1847.

thread of doubt as to the propriety of each, and only about this is there no doubt, that gonorrhœal ophthalmia is one of the most fatal of eye diseases. And when we consider the disaster so lamentable to the eminent surgeon alluded to early in this paper, who lost his eye though he had the advantage of the best skill which could be afforded, it does not seem presumptuous to advocate something different. Statistics as to the result of treatment are difficult to get at. Lawrence,* quoted by Mackenzie, says, of 14 cases, 9 had only 1 affected, of which 9 eyes, 6 were lost; of 5 cases having both affected, out of the 10 eyes, 6 were lost and 4 saved, and 3 retained perfect sight, though 1 had anterior synechia and 1 leucoma.

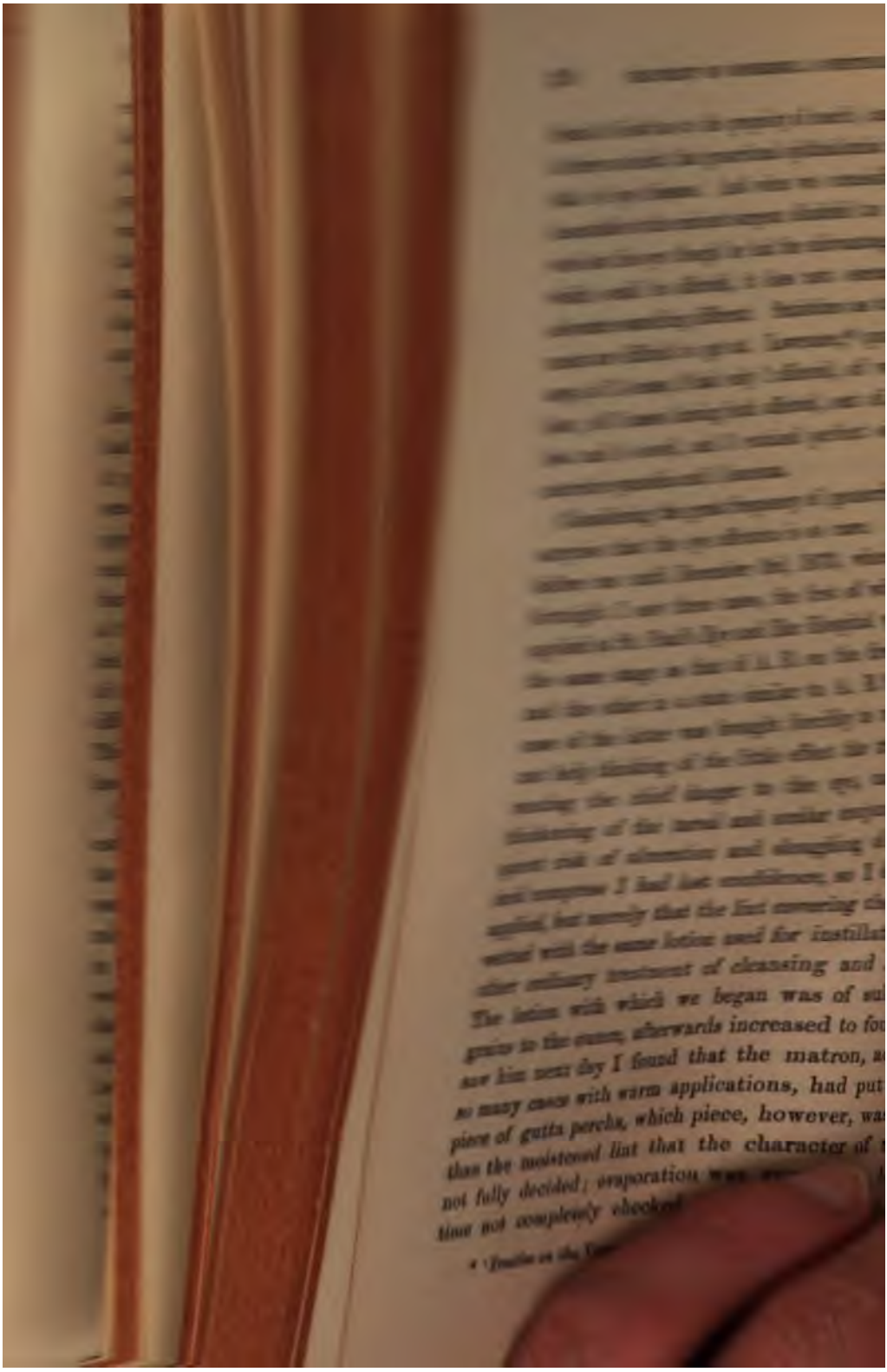
Considering the great frequency of gonorrhœa, it is a matter of surprise that the eye affection is so rare. No other case came before me until December 3rd, 1873, when in the space of a fortnight I saw three cases, the first of which, a youth, C. D., applied at St. Paul's Eye and Ear Hospital with one eye in about the same stage as that of A. B. on the first day of attendance, and the other in a state similar to A. B.'s at its height. The case of the latter was brought forcibly to my mind, and I could not help thinking of the little effect the treatment had in preventing the chief danger to the eye, namely, the enormous thickening of the tarsal and ocular conjunctiva, and the consequent risk of ulceration and sloughing of the cornea. In the iced compress I had lost confidence, so I did not order it to be applied, but merely that the lint covering the eyes should be kept wetted with the same lotion used for instillation. Of course, the other ordinary treatment of cleansing and anointing was used. The lotion with which we began was of sulphate of zinc, two grains to the ounce, afterwards increased to four grains. When I saw him next day I found that the matron, accustomed to treat so many cases with warm applications, had put outside the lint a piece of gutta percha, which piece, however, was so much smaller than the moistened lint that the character of the dressing was not fully decided; evaporation was very slow, but at the same time not completely checked. I examined the lids with some

* 'Treatise on the Venereal Diseases of the Eye,' p. 25. London, 1830.

apprehension, and to my delight found them rather better. I resolved, therefore, to take the hint. I had previous to this been constantly in the habit of using warm and moist applications for various inflammations of the globe itself, in which cold is generally prescribed, and having been long persuaded that moist heat is the most powerful agent for preventing and limiting acute inflammatory swelling and suppuration in other parts of the body, I determined to follow the lead I had got and to make a cautious trial in C. D.'s case. Accordingly, the lids of both eyes were covered with a large piece of lint dipped in the lotion and an ample piece of gutta percha was carefully bandaged over all. I looked at the eyes with some anxiety six hours afterwards, but found no reason to regret the treatment. The lids had lost completely the tense shiny appearance, there was no appearance of coagulation of discharge at the commissure, and the patient was quite comfortable. The treatment was, therefore, continued, the grave symptoms lessening materially every day. The severity of the disease in the worse eye may be judged by the fact that the affected groove was found, when we were able to lift the lid, to extend farther inwards than in the case of A. B. No rupture took place in this case, as the accident was well guarded against, and the only defect was in appearance, caused by the dense white crescent which filled up the ulcerated groove. Nevertheless, as the upper lid covered it, it was no detriment. The less affected eye recovered without any damage whatever.

In the other two cases what was noteworthy may be stated shortly. Of these, one was also a youth, E. F., who was in hospital on account of congenital syphilitic kerato-iritis. Being convalescent, and having a natural turn for nursing, he was employed by the matron to assist her in the treatment of C. D. Although he had been warned of the danger of contagion he managed to inoculate one of his own eyes, which, when my attention was called to it, showed the usual signs of early gonorrhœal inflammation. He was at once put to bed and the same treatment as in C. D.'s case was followed. *The eye never became worse,* and was well in a few days.

The last case was that of a married woman, G. H., who applied



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at St. Paul's on the 10th of December, 1873. Both her eyes were in an advanced stage of gonorrhœal ophthalmia, and there could be no doubt from the appearance of the lids that the cornea was severely ulcerated. Although warned of the danger of losing both eyes, she could not be persuaded to become an in-patient of the hospital. However, under as careful treatment as could be afforded to her as an out-patient, the discharge and swelling of the lids soon subsided. On account of temporary absence I did not see her for several days, when I found that the gonorrhœal signs proper had ceased, but that she had a perforation of the cornea and adhesion of the iris in both eyes. With similar treatment to that pursued in like circumstances in A. B. both eyes recovered with less damage to vision than might have been anticipated.

Since the case of G. H. I have not had a case of gonorrhœal ophthalmia in the adult, but I have pursued the same treatment in a good number of cases of children wherein the severity of the symptoms led one to believe that the disease was brought on by a poison, if not actually gonorrhœal, little less virulent. With the exception of one case, the infant daughter of a drunken mother, first seen when the disease had far advanced, I have had no instances of perforation of the cornea, and I therefore recommend for trial the treatment of severe ophthalmo-blenorrhœa as above described, as one which has proved itself in my hands safe, and, what is of some consideration for the patient, as against the caustic treatment, painless.

THE VECTIS AS AN OBSTETRIC INSTRUMENT.

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The discovery of this instrument is involved in considerable obscurity; it has been ascribed to Celsus, to Mauriceau, to Roonhuysen of Amsterdam, to the elder Chamberlen, and others.

It seems clear, at least, that it was known and used by both Roonhuysen and the Chamberlens, and by each of them was kept a profound secret, handed down and carefully preserved by their immediate successors, until about 1753, when two Dutch practitioners, MM. Jacobus de Vesscher and Hugo van de Poll, bought the secret for 5000 livres, and immediately published it to the world.

From this period the vectis has maintained its place in the practice of this country as an obstetric instrument, and may be said to have been employed side by side with the forceps, but with a varying degree of estimation; at some periods and by some accoucheurs being thought far superior to the forceps, at other times and by other practitioners being held in disfavour, or almost entirely abandoned as a trustworthy aid in difficult labour. Roonhuysen and Chamberlen used it as a lever of the first kind, the fulcrum being the pelvis, but the frequent injuries inflicted upon the soft parts of the mother by this palpably improper mode of employing it led Pearce, in 1772, to suggest a practice still occasionally adopted, viz. making one hand of the operator the fulcrum. Somewhat later (1783) Dease, of Dublin, altogether condemned its employment as a lever of the first kind, and proposed that it should be used as a

tractor only, and changed its designation from the vectis or lever to that of *The Extractor*. Dr. Hamilton, senior, considered the vectis extremely limited in its uses; Dr. Bland preferred it to the forceps; Dr. John Clarke concludes an unfavorable commentary upon it thus, "We either cannot use much force with the vectis, or if we do, it will be at the certainty of doing much mischief."

Dr. Burns, of Glasgow, regards it "more in the light of an aid to the pains than the forceps, and more dependent on them for success, consequently more limited in its utility. In this view it is a subordinate instrument, in so far as it is used in milder cases of arrest, which, perhaps, might ultimately have terminated by the natural efforts, but to which it might not have been prudent longer to have trusted."

Dr. James Hamilton, jun., thought that "it should only be employed in certain cases, where there is a slight degree of narrowness at the brim, or where the face of the infant is forced forwards."

Dr. Gooch attributed little or no value to the vectis, on account of its only aiding feeble pains and not supplying their place.

Dr. Conquest says, "Whilst under some circumstances the lever is doubtless preferable to the forceps, the latter is now very generally admitted to be in the majority of cases by far the most useful instrument."

Dr. Ashwell (1834) attaches but little comparative value to it.

Dr. Maunsel observes that "either instrument (forceps or vectis) may be employed by competent persons with perfect safety."

Dr. Blundell describes the tractor or lever as "an instrument excellent and of great effect in dextrous hands. If skill and judgment are wanting, even the tractor (vectis) may inflict dreadful injuries, but in such hands still greater mischief may be expected from the long forceps. To you, therefore, I recommend its use, as the safer instrument of the two, possessing, as it does in an eminent manner, the advantages of portability and ready application."

In France, Levret is the first writer who alludes to the vectis. He places it lower than the forceps in point of utility. Baude-

locque and Maygrier form a similar estimate of its value. Mad. Bovin (1817) has a very low opinion of it. "Le levier, cet instrument si long temps mysterieux chez les Hollandais, le levier lui-même commence à tomber en desuetude malgrè son apologiste Herbiniaux." Mad. La Chappelle discards it altogether. M. Velpeau admits its utility in certain cases.

It would appear, therefore, that up to the end of the last generation, although the vectis had its advocates and its utility, and even its preference to the forceps in certain cases was recognised, nevertheless it was in the estimation of by far the majority of authorities decidedly inferior in value to the forceps, and this too at a period when the latter instrument was not nearly so much appreciated, nor its powers and its employment so well understood or so extensively availed of, as it is at present. In those days instrumental delivery was regarded with what we now know to have been a mistaken exaggeration of its danger, which has happily been dispelled by the clearer knowledge of the subject afforded by the great advance in the physiology and mechanism of parturition. Even Burns, that eminent and accomplished teacher of obstetrics, thus wrote:—"Let it be carefully recollected, at the same time, that so long as the head advances ever so slowly, the patient's pulse continues good, the abdomen free from pain on pressure, and no obstruction to the removal of the urine, interference should not be attempted unless the *child be dead.*" More in accordance with our present views, and worthy of record as an indication of the then dawning light of an improved and sounder obstetric practice, are the words of Dr. Hamilton in his 'Practical Observations.' He says, "There is too much reason to believe that British practitioners, from their unwillingness to give pain or hurt the feelings of their patients, are apt to procrastinate and to lose the favorable time for safe and effectual interference. No intelligent practitioner would wait, in cases where the labour throes cease to have any influence in advancing the delivery of the head of the infant within reach of the forceps, till there be heat or tenderness of the passages, and still less till the patient's strength be much exhausted."

It may appear irrelevant and, perhaps, scarcely complimentary

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of slight impediments to the passage of the head." Dr. F. H. Ramsbotham enters fully into the relative merits of the two instruments, and gives a very decided preference to the forceps. Dr. Barnes limits its application to certain minor difficulties, as face presentations and allied malpositions. Simpson in his lectures taught the use of the vectis, but evidently put no high value upon its capabilities. As to the Dublin school, some estimate may be formed of the extent to which it is employed from the fact that in the large collection of cases reported by Johnson and Sinclair in one case only was the vectis used. So far as my acquaintance with the recorded opinions of the authorities of the day enable me to judge, the view almost exclusively held is that the lever, as compared with the forceps, is infinitely less important and valuable. It cannot, however, on the other hand, be denied that in our own time, as formerly, the vectis has been used with great success by some accoucheurs, who have therefore held and taught that it is not only equal to but superior to the forceps, a doctrine which is altogether at variance with my own experience and, as I have already shown, with that of a large majority of the authorities of the day—a doctrine, moreover, which if, as I believe, is not in accordance with the teachings of experience and sound practice, is calculated to mislead the inexperienced accoucheur, and at the same time to destroy the confidence hitherto placed in that most useful and trustworthy aid in difficult labour, the forceps.

As a mere question of mechanics, it is not easy to understand how the single-bladed instrument can possibly compete with the more complete double-bladed instrument; and as its advocates insist strongly on its being used, not as a lever, but as a tractor only, it is admitted that they dispense with lever action altogether, an element which constitutes one of the greatest advantages of well-constructed forceps when skilfully used. Another defect in the vectis is the impossibility of adding to other forces that of compression, which under certain circumstances is of the greatest assistance in overcoming obstruction without compromising the safety of mother or child. Among the alleged superior advantages of the vectis those of simplicity and greater facility of

introduction appear to me unworthy of consideration in scientific obstetrics, unless it can be shown that, not only are the difficulties of the operator lessened, but the safety and well-being of the woman and offspring are at the same time more effectually secured. I venture to say that no practitioner who has not learned how to apply the forceps without difficulty is fit to undertake the management of a severe nor, indeed, of the most simple case of obstructed labour. Certainly in unskilful or incautious hands an accident would much more readily occur during extraction with the lever than with the forceps, owing to the increased risk of slipping; indeed, I am persuaded that exceptional dexterity and special mechanical skill—greater, perhaps, than many average accoucheurs and even many of those of superior capabilities, have been able to acquire—are necessary to enable any one to accomplish with the lever that which can be effected with comparative facility with the more perfect instrument the forceps.

To those who have recently recorded great results accomplished by the vectis I would accord a tribute to their exceptional dexterity and mechanical skill, but cannot admit that they have thereby proved the greater excellence and suitability of the instrument they use. We have heard of surgeons who prided themselves on passing the catheter with one hand; the London sightseers have lately been astonished to see a man actually able to dance on one leg, and we are told he was able to execute saltatory movements with far more grace and agility than many persons could execute with both legs. Now, however much we may admire and wonder at these special instances of mechanical dexterity in certain individuals, we should hesitate to recommend surgeons in the one case or dancers in the other to waste their energies in striving to accomplish by these extraordinary means results which may be equally gained in the usual way. And for similar reasons we would advise obstetricians not to sacrifice their time and labour in striving to acquire the supererogatory mechanical skill to qualify them to effect with an incomplete and one-handed instrument that which can be done more easily, more safely, and more effectually by the more perfect two-handed

forceps. Those who imagine they have discovered a new and improved form of lever, and have enunciated a modern and novel doctrine as to the principles upon which it is to be used, will find on referring to the literature of the subject that their views on these points are really novelties only so far as they are sufficiently old to have fallen into oblivion and are now once more resuscitated for the benefit of modern readers. Those who maintain that no one is qualified to dogmatise upon the merits of the vectis unless he has had practical experience in its use in its alleged modern improved pattern and mode of application, have surely forgotten "Ars longa, vita brevis est." To condemn every accoucheur to try every kind of mechanical contrivance even of his own day before venturing to form his opinion as to its adaptability to its purpose would certainly silence criticism in all but those whose span of life was unusually prolonged. It is probable that a busy practitioner might live a hundred years and more before he could find opportunity to test by a single trial each one of the varieties of forceps which has been extolled as superior to all its predecessors.